Power Management

Product Guide

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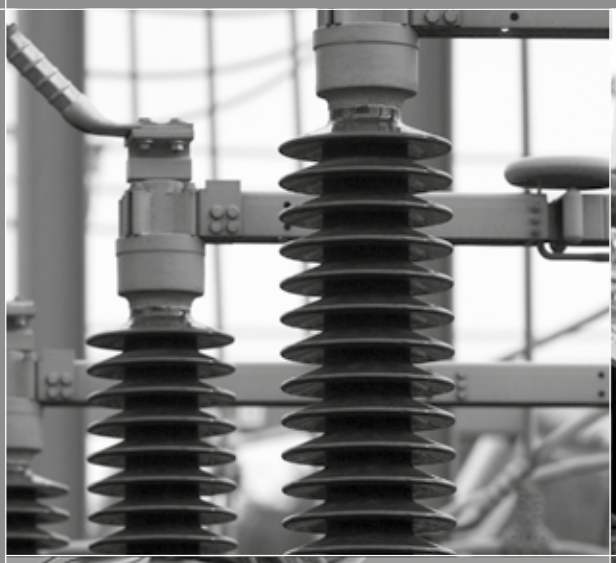
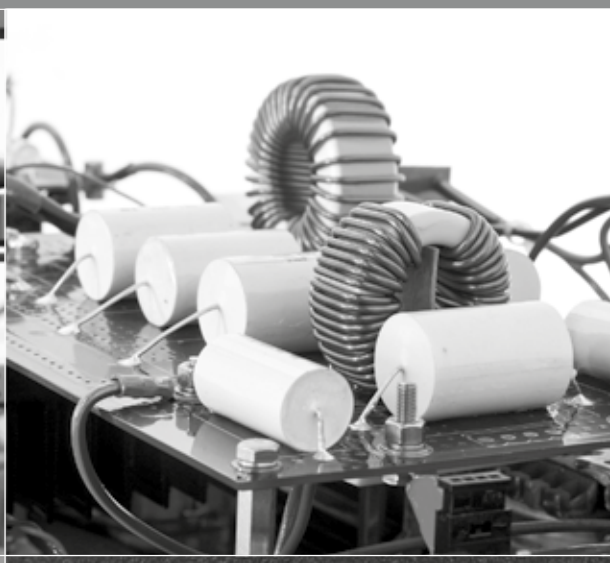
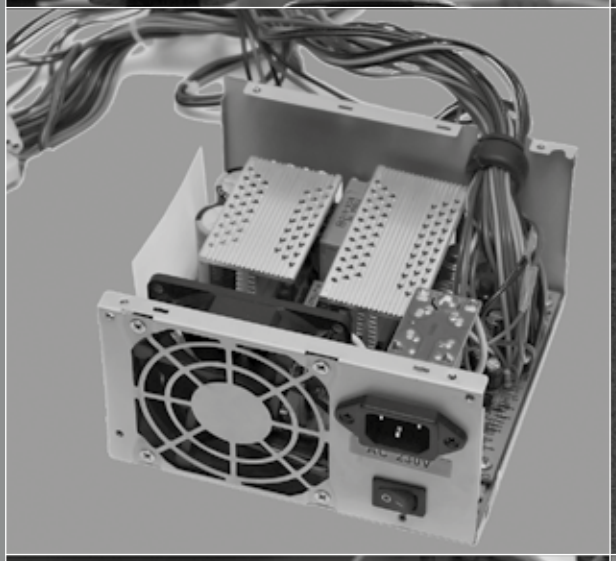
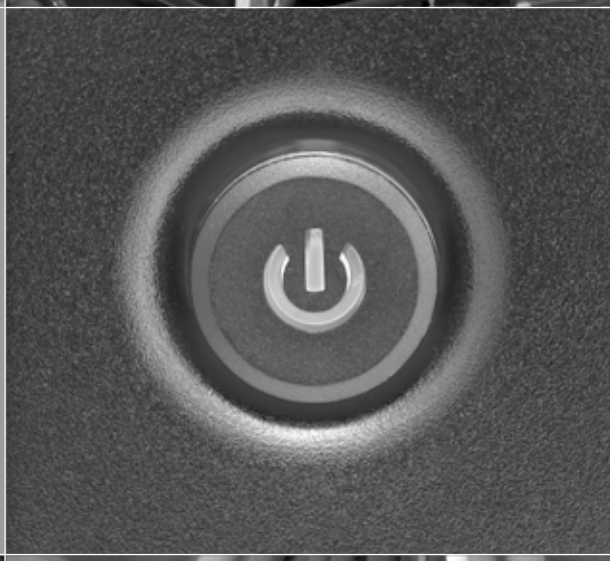
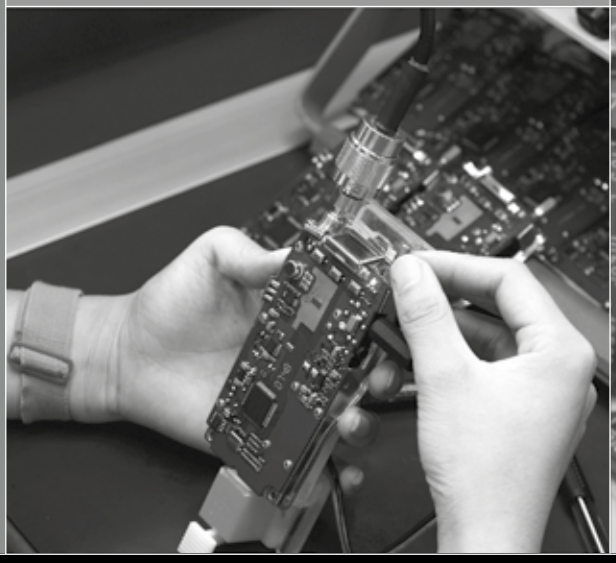
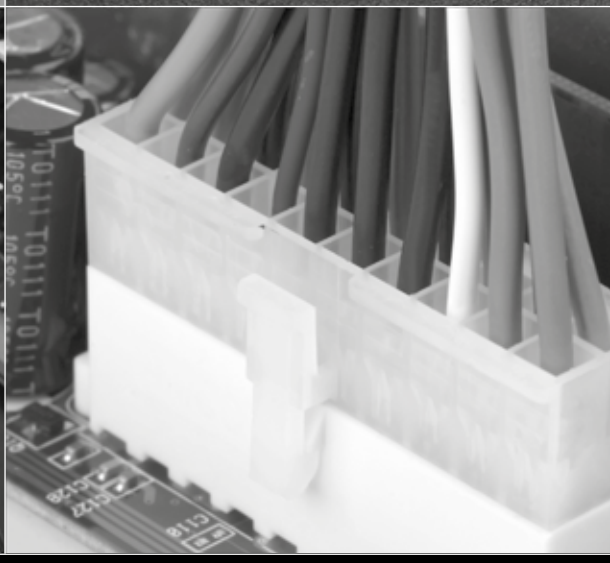

TTI, Inc. – Never Short on Solutions

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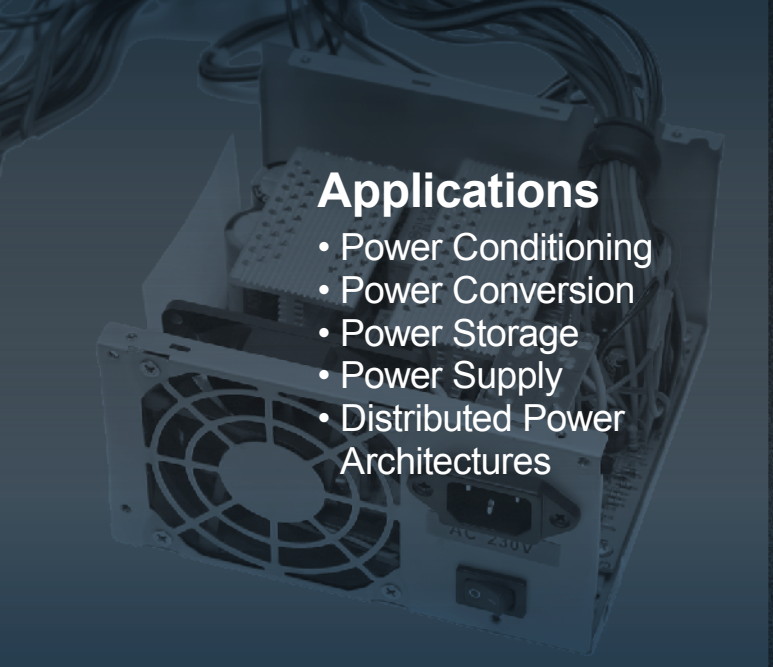
Power Management Solutions

- Reduction of overall energy consumption
- Prolong battery life for portable and embedded systems
- Reduction of cooling requirements
- Noise reduction
- Reduction of operating costs for energy and cooling



Applications

- Power Conditioning
- Power Conversion
- Power Storage
- Power Supply
- Distributed Power Architectures

Product Types

- Circuit Protection
- Electro-magnetic
- Electromechanical
- Discretes
- Connectors
- Passives
- Power Supplies

3M · Amphenol · API Delevan · AVX · BOURNS · C&K · COOPER Bussmann · DELPHI · EPCOS · ERICSSON · FCI · Glenair · HARWIN · Honeywell · KEMET · Kingbright · KOA · Leton · Littelfuse · Standex Meder · molex · muRata · nichicon · OHMITE · OMRON · Panasonic · PANDUIT · PHOENIX CONTACT · Radiall · SAMSUNG · SOURIAU · SPECTRUM · SYFER · TDK · TE connectivity · TOSHIBA · CARLISLE · TT electronics · VISHAY · VISHAY PRECISION GROUP · WIMA · YAGEO

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TTI, Inc. – Never Short on Solutions

The World's Leading Specialist Distributor for Passive, Connector, Electromechanical and Discrete Components for Power Management Solutions

TTI's European headquarters in Maisach-Gernlinden occupies 19,000m^2, with 16,000m^2 of dedicated warehouse space on three levels. We provide local service in over 40 sales locations across Europe.

Our suppliers are the most innovative and capable in the electronics industry. Together with them, we put emphasis on product knowledge, inventory and logistics to provide our customers with industry leading service support and value.

Our focused product line and comprehensive supply chain management solutions have made TTI the supplier of choice for our OEM and CEM customers worldwide.

By focusing on new product introductions, high technology products and working with Mouser, we provide our customers and suppliers with unparalleled design-in support, ensuring the best and newest parts are always available.

Modern Power Management electronics design places significant demands on circuit components and interconnect devices, as Power ICs deliver greater capability and the complexity of power architechture increases.

Why buy from TTI ?

TTI concentrates on the basic strategy of focusing on our products and striving to be the best at what we do. No other company offers the unique combination of benefits we provide:

- Specialist I, P&E and Discrete
- Deepest & Broadest Inventory
- Best in Class Support
- Leading Global Suppliers
- Focused Line Card
- Technology Leader
- Only Distributor with Catalogue Division – Mouser
- Opportunity to Consolidate Supplier Base
- Reduced Lead-Times
- Specialist Local Support
- World Class Supply Chain Programs
- Reduced Total Cost of Acquisition

EUROPE'S LARGEST INVENTORY

of Passive, Connector, Electromechanical and Discrete Components

3M

Amphenol®

API Delevan

AVX
A KYOCERA GROUP COMPANY

BOURNS®

C&K

COOPER Bussmann

DELPHI

EPCOS

ERICSSON
CHANNEL PARTNER

FCI

Glenair

HARWiN
INTERCONNECT DESIGN & MANUFACTURE

Honeywell

The Capacitance Company
KEMET
CHARGED.

Kingbright
Kingbright Electronic Europe GmbH

KOA
Your Passive Solution

Lelon

Littelfuse®
Expertise Applied | Answers Delivered

Standex
MEDER
ELECTRONICS

molex®
one company › a world of innovation

muRata

nichicon

OHMITE

OMRON

Panasonic

PANDUIT™

PHOENIX CONTACT
INSPIRING INNOVATIONS

Radiall™

SAMSUNG
SAMSUNG ELECTRO-MECHANICS

SOURIAU

SPECTRUM
Advanced Specialty
PRODUCTS
A Spectrum Control Business

SYFER

TDK®

TE connectivity
Authorized Distributor

TOSHIBA
Leading Innovation

CARLISLE
INTERCONNECT TECHNOLOGIES
TRI-STAR

TT electronics

VISHAY®

VISHAY
PRECISION
GROUP

WIMA®

YAGEO
Innovative Service Around the Globe

Passives

	API DELEVAN	AVX	BOURNS	COOPER BUSSMANN	EPCOS	ERICSSON	KEMET	KOA	LELON	LITTELFUSE	MURATA	NICHICON	OHMITE	PANASONIC	SAMSUNG	SPECTRUM CONTROL	SYFER CPM	TDK	TE CONNECTIVITY	TT ELECTRONICS	VISHAY	VISHAY PRECISION FOIL	VITROHM	WIMA	YAGEO
Resistors																									
Film			●					●					●	●	●	●			●	●	●		●		●
Foil													●									●			
Networks		●	●					●			●			●	●					●	●				●
Power/Wirewound			●					●					●	●					●	●	●		●		●
Carbon								●					●	●					●	●	●				●
Current Sense			●					●					●	●	●				●	●	●		●		●
Potentiometers & Trimmers																									
Precision/Panel Control			●										●	●					●	●	●				
Sensor/Encoder			●								●			●				●		●	●				
Trimmers			●								●			●			●		●	●	●				
Capacitors																									
Tantalum		●					●					●									●				
Ceramic		●			●		●				●			●	●	●	●	●			●				●
Aluminium				●	●		●		●			●		●							●			●	●
Film		●			●		●					●		●		●					●			●	
Polymer		●					●		●		●	●		●	●						●				
Supercapacitors		●		●			●				●	●		●				●			●				
Magnetics																									
Ferrite Beads	●		●				●				●			●	●			●	●	●	●				●
Ferrite Cores	●			●	●						●							●							
Chokes	●		●	●	●		●	●			●			●	●			●	●	●	●				●
Coils	●		●		●		●	●			●			●	●			●	●	●	●				●
Inductors	●	●	●	●	●		●	●			●			●	●			●	●	●	●				●
Transformers	●		●	●	●		●				●			●				●	●	●	●				●
Filters																									
EMI/RFI	●	●			●		●				●			●		●	●	●	●						
RF/Microwave	●	●			●						●			●		●	●	●							●
Circuit Protection																									
ESD Suppression	●	●	●	●	●					●				●					●						
Fuses		●	●	●				●		●				●					●		●				
Gas Discharge Tube (GDT)			●		●					●									●						
Resettable Fuses (PPTC)			●							●									●						
Thermistors (NTC)		●			●			●			●			●				●			●				
Thermistors (PTC)			●		●			●			●										●				
Thyristors			●							●									●						
Varistors		●	●	●	●			●		●				●				●	●		●				●
Timing Devices																									
Resonators		●									●							●							
Crystals		●													●						●				
Oscillators		●																			●				
Power																									
Isolated DC/DC						●					●														
Non Isolated POLs						●					●														
AC/DC											●														
Digital Power Management						●																			
Power Interface Modules						●																			

Discretes

	AVX	BOURNS	KINGBRIGHT	LITTELFUSE	PANASONIC	TOSHIBA	TT ELECTRONICS	VISHAY
Diodes								
Arrays		●		●		●	●	●
ESD Protection		●		●		●	●	●
Schottky	●	●			●	●	●	●
Switching		●			●	●	●	●
TVS Diodes	●	●		●			●	●
Zener		●			●	●	●	●
Rectifiers								
Avalanche		●						●
Bridge								●
Fast Recovery		●			●	●		●
Schottky		●			●	●	●	●
Standard Recovery		●					●	●
Ultrafast Recovery		●				●	●	●
Transistors								
FETs					●	●	●	●
IGBTs					●	●	●	●
MOSFETs					●	●	●	●
RF					●	●	●	●
Bipolar/Small Signal		●			●	●	●	
Thyristors								
DIAC				●				
SCRs		●		●				●
SIDACs				●				
TRIAC		●		●				
Optoelectronics								
LEDS/LED Modules			●		●	●	●	●
Displays			●				●	●
Couplers			●			●		●
Infrared Emitters			●				●	●
Infrared Receivers								●
IRDA Transceivers								●
Optical Sensors			●			●	●	●
Photo Detectors			●			●	●	●
Solid State Relays						●		●
Others								
Modules						●	●	●
Voltage Regulators							●	●
Analog Switches								●
Motor Control ICs								●
Fibre-Optic Devices						●		
General Purpose Logic ICs						●		
LED Drivers						●		●

Connectors

	3M	AMPHENOL	AVX	BOURNS	C&K	DELPHI	FCI	GLENAIR	HARWIN	MOLEX	OMRON	PANASONIC	PANDUIT	PHOENIX CONTACT	RADIALL	SOURIAU	SPECTRUM CONTROL	TE CONNECTIVITY	TRI STAR
Board-to-Board																			
1.25mm to 10.00mm pitch	●	●	●				●		●	●	●							●	
Pin Headers & Sockets	●	●	●				●		●	●	●	●						●	
High Speed Backplane	●	●	●				●			●	●							●	
Mezzanine	●						●			●	●							●	
Device-to-Board																			
IC & PLCC Sockets	●						●		●	●	●							●	
Memory Card Connectors	●	●	●				●		●	●								●	
LED Sockets							●			●								●	
Smart Card Connectors		●			●		●			●								●	
Wire-to-Board/Wire-to-Wire																			
1.25mm to 10mm pitch	●	●	●				●		●	●	●							●	
Discrete Wire	●	●	●				●		●	●				●				●	
FFC/FPC		●	●				●		●	●	●	●						●	
IDC/Mass Termination	●	●	●				●			●	●							●	
Power	●	●	●			●	●		●	●				●				●	
SCSI I, II, III	●	●					●			●							●	●	
SATA/SAS/mini SATA	●	●					●			●							●	●	
Input/Output																			
Audio		●				●	●		●	●							●	●	
Circular		●				●		●	●	●	●			●		●	●	●	●
D-Subminiature	●	●			●		●			●	●					●	●	●	
DVI/HDMI		●					●		●	●	●							●	
Micro D		●					●	●		●						●	●	●	
Modular Plugs & Jacks		●					●			●							●	●	
Power		●				●	●	●	●	●						●	●	●	●
SFP/XFP		●					●			●								●	
RJ/Industrial Ethernet		●					●			●				●		●	●	●	
USB/Mini USB/USB OTG		●	●			●	●		●	●	●							●	
RF/Coaxial/Microwave																			
1.0/2.3, 1.6/5.6 & 7/16		●								●					●			●	
BNC (50/75 omega/TNC)		●								●					●			●	
MCX/MMCX		●							●	●					●			●	
QMA		●													●			●	
SMA, SMB, SMC, SSMA		●								●					●			●	
Type F		●								●					●			●	
Automotive/Transportation																			
Automotive		●	●			●	●			●			●			●		●	
Agriculture		●	●			●	●	●	●	●			●			●		●	
Commercial Vehicles		●	●			●	●	●	●	●			●			●		●	
Construction		●	●			●	●	●	●	●			●			●		●	
Marine		●	●			●	●	●	●	●			●			●		●	
Mass Transit		●	●			●	●	●	●	●			●			●		●	
Recreational Vehicles		●	●			●	●	●	●	●			●			●		●	
Speciality Connectors																			
Battery		●	●	●			●	●	●	●								●	
COTS		●						●	●	●						●	●	●	
Filtered		●				●	●	●		●						●	●	●	
Hermetic		●				●	●	●		●						●		●	
High Voltage		●				●	●	●	●	●				●		●		●	
Industrial	●	●	●					●	●	●				●		●		●	
Micro Miniature/Nano	●	●	●				●	●		●		●						●	
Military/Aerospace		●				●		●	●	●						●	●	●	●
Space		●			●	●		●	●							●		●	
Solderless Terminals																			
Insulated	●					●			●	●			●					●	
Non-Insulated	●					●			●	●			●					●	
Terminal Blocks																			
PCB Mounted		●	●				●			●				●				●	
DIN Rail Mounted		●												●				●	
Tooling																			
Hand Crimp Tools	●	●	●			●	●		●	●			●			●	●	●	●
IDC Presses	●	●				●	●			●						●		●	
Semi-Automatic Crimp Tools	●	●				●	●		●	●			●			●		●	
Wire & Cable																			
Cable Assemblies/Value Added	●					●	●	●		●				●			●	●	
Discrete Wire	●																	●	
FFC Jumpers										●								●	
Flat Ribbon	●	●																●	
Wire Management & Accessories																			
Cable Management	●					●			●				●					●	
Backshells	●	●	●			●	●	●		●						●		●	●
Heat Shrink Products	●							●		●			●					●	
Labels & Labelling Systems													●	●				●	
Printers & Supplies													●	●				●	
Power																			
AC Power Connectors		●				●		●		●				●		●		●	
Busbar Solutions		●				●	●							●		●		●	
DC Power Connectors		●				●	●	●	●	●				●		●		●	
Heavy Duty Power Connectors		●				●		●	●	●				●		●		●	
Power-to-Board Connectors		●				●	●		●	●				●		●		●	

Electromechanical

	BOURNS	C&K	HONEYWELL S&C	MEDER ELECTRONIC	OMRON	PANASONIC	TE CONNECTIVITY
Relays							
Signal				●	●	●	●
Power					●	●	●
General Purpose					●	●	●
Military/Aerospace							●
Solid State						●	●
High Frequency				●	●	●	●
Automotive						●	●
Reed				●			●
High Voltage				●			●
Sockets & Accessories					●		●
Sensors				●	●	●	
Photomos					●	●	
Switches							
DIP/SIP		●			●		●
Slide		●					●
Push-button		●	●		●		●
Rocker/Paddle		●	●			●	●
Toggle		●	●			●	●
Thumb/Push Wheel		●					●
Tactile	●	●			●	●	●
Snap Action/Detect		●	●		●	●	
Special Purpose		●			●	●	●
Switchlock		●					●
Key Switch		●					●
Navigation		●	●				
Wireless		●	●				
Sensors							
Speed/Position			●	●		●	●
Thermal			●				
Pressure			●	●	●	●	
Military/Aerospace			●				
Automotive			●	●			●
Airflow			●		●		
Current			●				
Optical			●			●	
Power							
AC Power Entry Modules							●
Power Relays					●	●	●

CoolPower® Slim Drawer

Amphenol CoolPower® Slim Drawer connectors combine robust, high performance reliability with cost effective features critical in today's power applications.

Features & Benefits

- Power, signal and mixed contact combinations up to 8 power + 40 signal
- High current CoolBand or RADSOK® power contacts for maximum performance
- Current Rating: Up to 60A per size 8 contact
- Optional sequential contact engagement (first make/last break)
- UL 1977 compliance
- Integrated alignment correction
- Available metal guide pin/float mount system for additional mating reliability
- PCB orientation features and keying to prevent improper mounting and mating

Applications

- Accommodate a variety of mixed power and signal contact arrangements to serve in a number of power supply and distribution applications

CoolPower® D-sub

LCC17 SERIES

Amphenol CoolPower® D-sub connectors offer the familiar shape and functionality of a combination D-subminature connector with high current, high performance Amphenol CoolBand contact technology.

Features & Benefits

- Fully interchangeable with standard D-subs*
- High current CoolBand or RADSOK® power contacts for maximum performance
- 3W3 contact arrangements, male and female
- PCB solder tail, solder cup, crimp terminations

*CoolPower D-sub male and female connectors must be used together

Applications

- Networking, telecom and wireless
- Power supply and amplifier
- Military/aerospace
- Industrial and medical

Energy Razor®

Energy Razor® is an ideal power connector series for power distribution to provide a mixed power and signal solution designed to handle up to 30A.

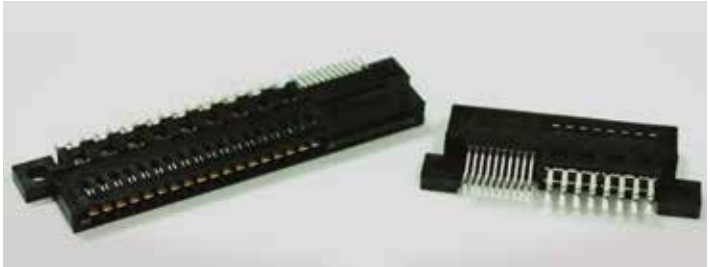
Features & Benefits

- Compatible with UL requirement
- Multiple contact design ensures great contact reliability
- Blind-mating capability with guiding pin design
- Venting hole for great thermal performance
- Capability for expansion to 16 power pins and 24 signal pins

Applications

- AC/DC power supplies
- Power distribution board
- Board-to-board connection in server, storage and telecommunication equipments

Energy Edge®



Energy Edge® is next generation power solution for power distribution. It is designed to handle up to 9A per power contact.

Features & Benefits

- Compatible with UL requirement
- Low profile design for saving valuable space
- Venting hole design for great thermal performance
- One-piece assembly is cost saving
- Capability for expansion to 56 power pins and 24 signal pins

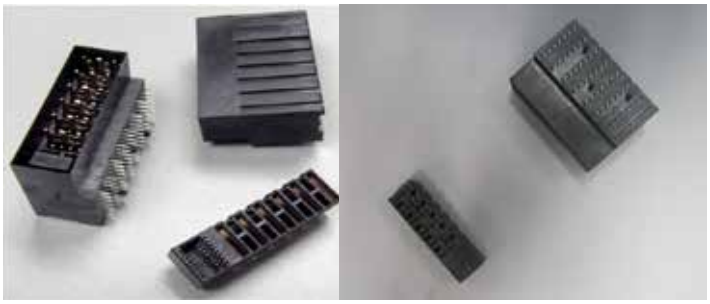
Applications

- Power distribution board
- Board-to-board connection in server, storage and telecommunications equipment

Customised Power Solution

Features & Benefits

- Tailor made power solution for customers
- Flexible for change to meet the customer requirements



PowerSafe Connectors

Features & Benefits

- Focus both on user safety and the 38999 series IIII performances
- One earth contact linked to the shell (first mate/last break)
- One pilot contact (last mate/first break) to be used as a relay of power break before disconnecting the mated pair
- Qualification in progress according to the most stringent standards:
  – User safety : DIN EN-61984 (VDE 0627)
  – Product standard : VG96944

Applications

- Defence:
  – C4ISR/Battlefield/Ground Vehicules
  – Avionics
  – Missile
  – Harsh industrial markets
  – I/O Power for boxes
  – Power connectors spread on the field (drums)
  – Electric power generator

ErgoN

Features & Benefits

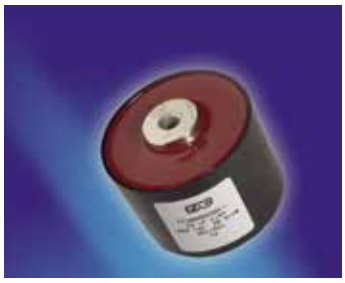
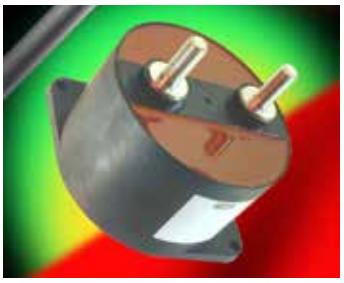
- Up to 350 A current (Radsok Technology)
- Interlock contacts, already shunted in factory
- IP2X unmated and IP67 mated
- Easy and secure Push and Lock Mating mechanism
- Mechanical coding moulded on shells (keys)
- Possibility to have male or female insert on each shell
- 3 colours available (Red, Black, Blue)
- High mating cycles (3000) and low insertion forces (railway proven technology)
- Possibility to have a double locking (optional)
- Power and battery management system layouts available
- High current capabilities
- Safe for the user and the electronics
- Easy to connect and disconnect
- Robust and sealed
- High mating cycles

Applications

- Full electric cars batteries
- Electric trucks and buses
- Power plants:
  – Traditional
  – Windmills
  – Solar farms

Industrial Film Capacitors

AVX offers a wide range of industrial power film capacitors using both dry and oil filled technology, in a wide array of sizes, shapes, voltage ratings and cap. Manufactured in France using a metallized polymer film as the dielectric: Polyester (75Vdc to 400Vdc) Polypropylene (500Vdc to 100kVdc) Features an AVX-developed controlled self-healing technology (a key characteristics that ceramic caps do not have) which provides long-life by isolating dielectric defects and eliminating catastrophic failure. Good replacements for electrolytics

Features & Benefits

- Controlled self-healing
- Handle surge voltage up to 2 times rated voltage and reverse voltage
- Withstand fast discharge
- Designed for high RMS current
- No pollution risk
- High reliability
- Excellent end of life position
- Safe, easy storage
- Alternative to electrolytic, mica, film foil and ceramic
- High energy storage: 2J/cm^3
- Excellent technical support
- Broad product range
- Custom and standard products
- Excellent volumetric efficiency

Applications

- High voltage applications that need long lifetime and protection from surge/over voltage, voltage reversal, and variable and high peak current
- DC filtering
- Protection
- Tuning
- Discharge
- Traction
- Power conversion
- Solar, wind and fuel cells
- Power supplies
- Welding
- Induction heating


Medium Power Film: FE and FB Series DC Link

The FE series uses a non-impregnated metallized polypropylene dielectric specially treated to have a very high dielectric strength in operating conditions up to 100˚C. Their 4-leaded (FE Series) and 2-Leaded (FB Series) form factor is designed for printed circuit board mounting with standard wave soldering. FE and FB series performance characteristics make them a viable alternative to aluminium electrolytic technology due to much lower ESR and much higher surge voltage capability (dv/dt).

Features & Benefits:

- Low-loss polypropylene dielectric
- Self-healing technology
- RoHS compliant

Applications:

- Solar micro-inverter
- Charging stations
- Induction heaters
- HVDC
- Welders
- Industrial DC link
- Telecom infrastructure
- Motor drive


High Current Moulded Power Inductors with Flat Wire Technology in 7mm Sizes

Features & Benefits

- Shielded construction
- Flat wire
- Unit height as low as 3.00mm
- Inductance range: 0.1µH to 10µH
- Rated current up to 32A
- Iron core
- High saturation current
- RoHS compliant*

Applications

- DC/DC converters
- Power supplies for:
  - Laptop computers
  - Camcorders, HDTV, car audio systems
  - Video game consoles
- Voltage regulator modules
- Desktop computers
- Servers
- Graphic cards
- Navigation systems
- Personal multimedia devices
- Automotive electronics and medical equipment

*RoHS Directive 2002/95/EC January 27 2003 including annex and RoHS Recast 2011/65/EU June 8 2011

Electrical Specifications

Bourns Part Number	Inductance L (µH) ±20%	I rms (A)	I sat (A)	DCR max. (mΩ)
SRP7030-R10FM	0.10	32	60	1.7
SRP7030-R15FM	0.15	28	37	1.99
SRP7030-R20FM	0.20	23	34	2.4
SRP7030-R22FM	0.22	23	34	2.4
SRP7030-R33FM	0.33	18	25	3.4
SRP7030-R47FM	0.47	17	19	4.5
SRP7030-R56FM	0.56	15	17	5
SRP7030-R68FM	0.68	15	17	5
SRP7030-R82FM	0.82	12	14	6.6
SRP7030-1R0FM	1.0	11	13	7
SRP7030-1R1FM	1.1	11	13	7
SRP7030-1R5FM	1.5	10	12	10
SRP7030-2R2FM	2.2	7	11	20
SRP7030-3R3FM	3.3	7	10	24
SRP7030-4R7FM	4.7	5	7	35
SRP7030-5R6FM	5.6	5	6	45
SRP7030-6R8FM	6.8	4.5	5.5	50
SRP7030-8R2FM	8.2	4.5	5	54
SRP7030-100FM	10	3.5	5	60

Overview of the Most Used SRP High Current Power Inductor Series

High Current Series	SRP4020	SRP5030T	SRP6540	SRP7030	SRP7030"F"	SRP1040	SRP1235	SRP1250	SRP1270
Model Size (mm)	4.8 x 4 x 2	5.7 x 5.2 x 2.8	7.2 x 6.5 x 4	7.8 x 7 x 3	7.6 x 6.5 x 3	11.8 x 10.5 x 4	13.9 x 13.9 x 3.7	13.9 x 13.9 x 5.9	13.7 x 13.7 x 7
Wire Technology	flat	round	round	round	flat	round	round	round	round
Inductance Range (µH)	0.22 – 5.6	0.33 – 10	0.56 – 47	0.1 – 10	0.1 – 10	0.15 – 15	0.1 – 10	0.22 – 10	0.32 – 10
DCR (mΩ)	7 – 90	5 – 128	4.4 – 366	1.7 – 85	1.7 – 60	1.3 – 57	0.96 – 34	1.0 – 25	0.9 – 17
Heating Current (A)	2.4 – 11.5	2.75 – 14	1.6 – 18	4.5 – 42	3.5 – 32	3 – 34	7 – 43	9 – 45	10 – 46

New Semi-Shielded Power Inductor Series SRN3010, SRN4018, SRN5020 and SRN1060

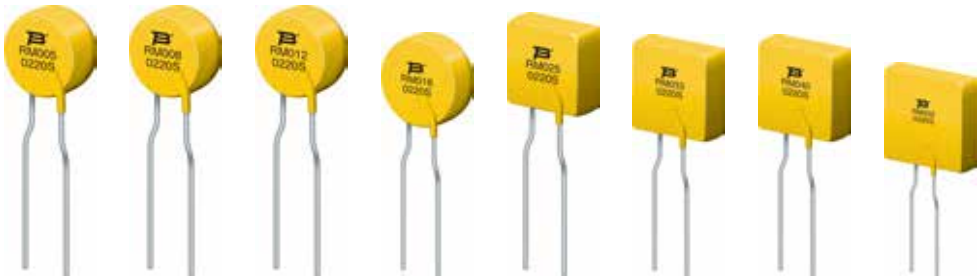
Features & Benefits
- Semi-shielded construction
- High inductance
- Inductance range: 0.82µH – 470µH
- High rated current – up to 5.4A
- RoHS compliant* and halogen free**

Applications
- DC/DC converters
- Notebook computers
- Digital video cameras
- Televisions, LCD displays

Multifuse® MF-RM Polymer PTC Resettable Fuses 240Vac Family

Features & Benefits
- Radial leaded devices
- Cured, flame retardant epoxy polymer insulating material meets UL 94V-0 requirements
- Bulk packaging, tape and reel available
- Resettable circuit protection
- Agency recognition:
- RoHS compliant*

Applications
- Food blenders, coffee machines
- HVAC
- Electric fans, blowers
- AC adaptors



*RoHS Directive 2002/95/EC January 27 2003 including annex and RoHS Recast 2011/65/EU June 8 2011. **Bourns follows the prevailing definition of 'halogen free' in the industry. Bourns considers a product to be 'halogen free' if (a) the Bromine (Br) content is 900ppm or less; (b) the Chlorine (Cl) content is 900ppm or less; and (c) the total Bromine (Br) and Chlorine (Cl) content is 1500ppm or less.

PWR220T, 221T, 263S, 163S Series Power Resistors

PWR Series from Bourns are high performance COTS power resistors in industry standard TO housings. They are rated to high power and can withstand high amounts of energy within rated limits. The PWR Series comes in surface mount and through-hole versions. All parts are hot tin-dipped. PWR Series are used for current sense, current limiting or capacitor discharge functions in power supplies.

Features & Benefits
- Copper backplane or ceramic backplane
- Low inductance
- High pulse capability

PWR163S-25

Features & Benefits
- DPAK style housing
- 25W power rating
- Resistor electrically isolated from backplane
- Compatible with LF reflow temperatures

PWR221T-30

Features & Benefits
- TO220 style housing
- 30W power rating
- Ceramic backplane

PWR263S-20

Features & Benefits
- D2PAK housing
- 20W power rating
- Resistor electrically isolated from backplane
- Compatible with LF reflow temperatures

PWR220T-20

Features & Benefits
- TO220 housing
- 20W power rating
- Resistor electrically isolated from backplane

MPI Series: High Current Miniature Power Inductors

MPI4040 and MPI2520 Series

High peak current capability take performance and application flexibility to new levels in a small package.

Features & Benefits
- Greater design versatility
- Break-through core technology
- Greater performance
- Environmentally friendly

Applications
- AC/DC – DC/DC converters
- Voltage regulator modules (VRM)
- LED drivers (lighting, backlighting)
- Noise filtering: power supplies
- EMI/EMC
- LCD displays
- Point-of-load converters (POL)
- Motor controls/drives

High Current Power Inductors HCM Series

Features & Benefits
- Pack more power in smaller spaces with greater efficiency
- High current carrying capacity and low core losses optimising power density performance
- Utilisation of flat wire technology reduces the DCR resulting in improved efficiency

Applications
- Voltage regulator modules (VRM)
- Multi-phase regulators
- Point-of-load modules
- Desktop and server VRMs and EVRDs
- Base station equipment
- Notebook regulators
- Battery power systems
- Graphics cards
- Data networking and storage systems

20-Year PowerStor Supercapacitors

Enable high reliability applications – 300F and 400F XB and XV series deliver reliability with the longest life available for high power supercapacitors.

Features & Benefits
- High capacitance
- Environmentally friendly
- Industrial operating temperature range
- Ultra-low equivalent series resistance (ESR)
- Long operating life
- Configurable for voltage or energy storage

Applications
- Power solar heliostat tracking
- Wind turbine blade pitch control
- Energy regeneration and motor start in escalators, elevators, fork lift trucks and HEVs
- Peak power: X-ray machines
- Telecom system hold-up/UPS
- RAID storage mains fail protection
- Extend usable battery life

SMT Shielded Drum Inductors

Features & Benefits
- These high energy density SMT inductors provide the highest performance levels in the smallest, most cost-effective packages
- Optimised best peak current performance can reduce the need for using a larger package size
- High efficiency delivers lowest high-frequency losses
- Operating temperature -40˚C – +125˚C
- Ideal for cost-sensitive, space-constrained applications

Applications
- LCD panels
- LED driver
- Wireless modems
- ADSL line cards
- Battery chargers
- Video cards

16V Modules

Features & Benefits
- High power density
- High energy density
- Long cycle life
- Voltage and temperature monitoring
- Active cell balancing

Applications
- Heavy duty transportation
- Utility vehicles
- Hybrid systems
- Industrial/material handling
- UPS/telecom
- Renewable energy systems
- Load levelling

Bussmann, Coiltronics and PowerStor are now part of Eaton

HV 1000/2000 Shield Pack Series

Features & Benefits

- High-current carrying capability
  – HV 1000 Shield Pack – 145A
  – HV 2000 Shield Pack – 250A
- Hand engage/disengage eliminates the need for tools and reduces manufacturing time
- Terminal system can mate in the inline or right angled direction
- Connector Position Assurance (CPA) and Terminal Position Assurance (TPA) for superior connector reliability
- Robust vibration performance in harsh environments

Applications

Delphi's HV 1000/2000 Shield Pack Series is the ideal solution for sealed and shielded high current/high voltage applications

- HV batteries
- Power electronics
- Inline connections
- Automotive (EV, HEV, PHEV)
- Commercial vehicles
- Construction
- Agriculture
- Industrial equipment

Power Pack Series (PP)

Features & Benefits

- High-current carrying capability
  – Power Pack 2000 – 250A
  – Power Pack 1000 – 145A
- Hand engage/disengage eliminates the need for tools and reduces manufacturing time
- Individually sealed terminal cavities for redundant sealing protection
- Terminal system can mate in the in-line or right angle direction
- Connector Position Assurance (CPA) and Terminal Position Assurance (TPA) for superior connection reliability
- Robust vibration performance in harsh environments

Applications

Delphi's Power Pack Connectors are an ideal fit for high-current/ high-power sealed and unsealed applications

- Electrical center power feed
- Electric power steering
- Front wall pass-through
- High-current module interface
- Hybrid vehicle modules
- In-line for battery cable
- Automotive
- Commercial vehicles
- Construction
- Agriculture
- Industrial equipment

DCS Power Connectors

The DCS Power Housing is user friendly with integrated secondary lock device allowing detection of unsealed terminals. It offers easy and quick connection system with male terminal guiding system as well as sealing performance ensured by single wire seal and a radial interfacial seal.

Features & Benefits

- Power sealed connectors
- Sealed – IP67
- Temperature range: -40˚C – +120˚C
- Terminal size: 9.5mm
- High current up to 75A
- Terminal Position Assurance (TPA)
- Connector Position Assurance (CPA)
- Male and female
- Typical… under bonnet

Applications

Automotive, heavy-duty truck and construction/agricultural applications:

- Electrical centre power feed
- Electric power steering
- Front wall pass-through
- High-current module interface
- Air conditioning units

APEX-280 2-WAY Connectors

These inline connectors are designed for hybrid and electrical applications including peripheral shielding applications such as air conditioning, heating and in-car charging.

A unique integrated electric interlock and the CPA (Connector Position Assurance) with dual sealing feature when mated: External: IPx9K, IP67, 1000mbars under air pressure; Internal: individual cavity sealing with SWS*IP2X B electrical shock protection.

Features & benefits

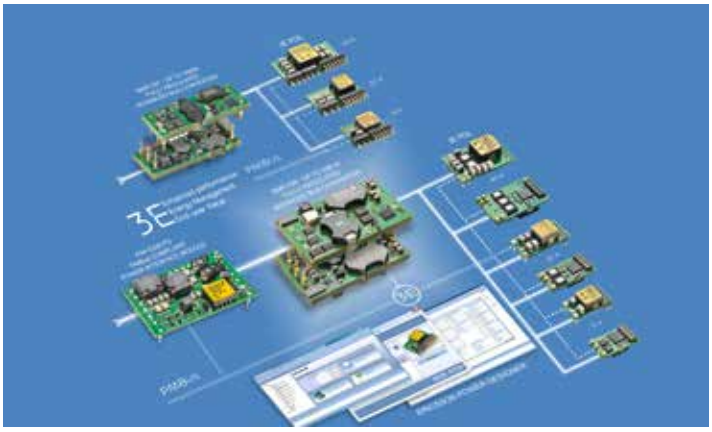
- High voltage: 400/800V
- Ergomate system with two-step disconnection system
- Dual sealing feature
- Shielding: 60dB at 100MHz
- Integrated interlock system
- Current rating: 35A at 70˚C

Applications

Medium current, high voltage DC connections for:

- Heating devices
- Air conditioning
- In-car charging

Formed in the late seventies, Ericsson Power Modules is a division of Ericsson AB that primarily designs and manufactures isolated DC/DC converters and non-isolated voltage regulators such as point-of-load units ranging in output power from 1W to 750W for use in information and communication technology (ICT) applications in distributed power architectures. Ericsson has many Industry first innovations to its credit, developed over 30 years of operating. In 1983, the company introduced the first high-frequency switching DC/DC power module, and in 1993 it launched the first miniaturised DC/DC converter. In 2008, it launched the first fully digitally controlled and programmable quarter brick Advanced Bus Converters (ABC), and 3E* digitally controlled point of loads (POL) regulators, followed by an eighth-brick ABC and Power Interface Modules, all of which are PMBus compliant.



PIM 4000 Series Power Interface Modules Input 36-75V, Output up to 10-12A/540-648W

Features & Benefits

- Industry standard low profile quarter-brick 57.9mm x 36.8mm x 13.7mm (2.28in x 1.45in x 0.539in)
- 400W at 40Vin, 480W at 48Vin, 540W at 54Vin
- Accurate 'on-the-fly' adjustable output voltage (via PMBus)
- High efficiency, typ. 99% at 300W
- 10A output current at 70˚C 0.5m/s (100LFM) airflow
- Low EMI design for CISPR Class B
- Monitoring via I2C and PMBus
- 2250Vdc input to output isolation
- Optimised for ATCA applications
- Basic insulation according to UL 60950-1
- MTBF 1.8Mh

Applications

- Dual power feeds input and enable
- Input transient suppression (IEC & ANSI standards)
- Reverse polarity protection
- Input under voltage shutdown
- Over temperature protection
- Output current protection
- A/B Feed loss alarm
- Inrush protection and hot swap functionality
- Hold-up charge and management
- 12W dual management power output
- Highly automated manufacturing ensures quality
- ISO 9001/14001 certified supplier

BMR456 Series Fully regulated Advanced Bus Converters Input 36-75V, Output up to 39A/468W

Features & Benefits

- Advanced bus converter industry standard quarterbrick with digital PMBus interface 57.9mm x 36.8mm x 11.3mm (2.28in x 1.45in x 0.445in)
- Optional industry standard 5-pins for intermediate bus architectures
- Industry-leading power density for telecom and datacom 127-141W/in²
- Accurate 'on-the-fly' adjustable output voltage (via PMBus)
- High efficiency, typ. 96.4% at half load, 12Vout
- Fully regulated advanced bus converter from 36-75Vin
- 2250 Vdc input to output isolation
- Optional baseplate for high temperature applications
- Droop load sharing with 10% current share accuracy
- Optional high capacitive load up to 15mF
- PMBus Revision 1.2 compliant
- 2.9 million hours MTBF
- ISO 9001/14001 certified supplier

Applications

- Configurable soft start/stop
- Voltage margining
- Voltage/current/temperature monitoring
- Configurable output voltage
- Configurable fault response
- Power good

BMR457 Series Fully regulated Advanced Bus Converters Input 36-75V, Output up to 25A/300W

Features & Benefits

- Advanced bus converter industry standard eighth-brick with digital PMBus interface 58.4mm x 22.7mm x 10.2mm (2.30in x 0.89in x 0.40in)
- Optional industry standard 5-pins for intermediate bus architectures
- Industry-leading power density for telecom and datacom 129-147W/in²
- Accurate 'on-the-fly' adjustable output voltage (via PMBus)
- High efficiency, typ. 95.2% at half load, 12Vout
- Fully regulated advanced bus converter from 36-75Vin
- 2250Vdc input to output isolation
- Optional baseplate for high temperature applications
- Droop load sharing with 10% current share accuracy
- PMBus Revision 1.2 compliant
- 2.9 million hours MTBF
- ISO 9001/14001 certified supplier

Applications

- Configurable soft start/stop
- Voltage margining
- Voltage/current/temperature monitoring
- Wide output voltage range
- Configurable protection features

BMR 462 Series PoL Regulators Input 4.5-14V, Output up to 12A/60W

Features & Benefits

- Small package Laydown: 21.0mm x 12.7mm x 8.2mm (0.827in x 0.5in x 0.323in) SIP: 20.8mm x 7.6mm x 15.6mm (0.82in x 0.3in x 0.612in)
- 0.6V – 5.0V output voltage range
- High efficiency, typ. 97.1% at 5Vin, 3.3Vout half load
- Configuration and monitoring via PMBus
- Synchonization and phase spreading
- Voltage tracking and voltage margining
- MTBF 21.2Mh
- Non-linear response for reduction of decoupling cap
- Input under voltage shutdown
- Over temperature protection
- Output short-circuit and output over voltage protection
- Remote control and power good
- Voltage setting via pin-strap or PMBus
- Easily configurable with graphical user interface
- ISO 9001/14001 certified supplier
- Highly automated manufacturing ensures quality

Applications

- For narrow board pitch applications (15 mm/0.6in)

BMR463 Series PoL Regulators Input 4.5-14V, Output up to 20A/66W

Features & Benefits

- Small package 25.65mm x 13.8mm x 8.2mm (1.01in x 0.543in x 0.323in) SIP: 26.3mm x 7.6mm x 15.6mm (1.035in x 0.30in x 0.614in)
- 0.6V – 3.3V output voltage range
- High efficiency, typ. 97.1% at 5Vin, 3.3Vout half load
- Configuration and monitoring via PMBus
- Synchonization and phase spreading
- Current sharing, voltage tracking and voltage margining
- MTBF 20.2Mh
- Non-linear response for reduction of decoupling cap.
- Input under voltage shutdown
- Over temperature protection
- Output short-circuit &and output over-voltage protection
- Remote control and power good
- Voltage setting via pin-strap or PMBus
- Easily configurable with graphical user interface
- ISO 9001/14001 certified supplier
- Highly automated manufacturing ensures quality

Applications

- For narrow board pitch applications (15mm/0.6in)

BMR464 Series PoL Regulators Input 4.5-14V, Output up to 40A/132W

Features & Benefits

- Small package 30.85mm x 20.0mm x 8.2mm (1.215in x 0.787in x 0.323in) SIP: 33.0mm x 7.6mm x 18.1mm (1.30in x 0.30in x 0.713in)
- 0.6V – 3.3V output voltage range
- High efficiency, typ. 97.2% at 5Vin, 3.3Vout half load
- Configuration and monitoring via PMBus
- Synchonization and phase spreading
- Current sharing, voltage tracking and voltage margining
- MTBF 14.2Mh
- Non-linear response for reduction of decoupling cap.
- Input under voltage shutdown
- Over temperature protection
- Output short-circuit and output over-voltage protection
- Remote control and power good
- Voltage setting via pin-strap or PMBus
- Easily configurable with graphical user interface
- ISO 9001/14001 certified supplier
- Highly automated manufacturing ensures quality

Applications

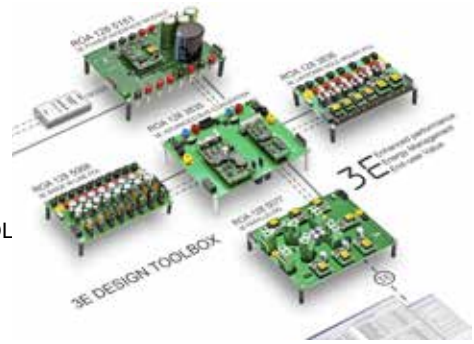
- For narrow board pitch applications (15mm/0.6in)

3E Design Toolbox

Ericsson 3E Design Toolbox includes a set of five evaluation boards that can be operated as standalone devices or interconnected to mirror complex applications requiring multiple power rails with specific configuration profiles such as sequencing, tracking, and load sharing and distribution. The toolbox also includes the Ericsson 3E software, which, via the USB/PMBus interface, can monitor, configure and control any Ericsson 3E or PMBus-compliant unit connected to the boards.

- ROA1285151 (PIM Module) industry-standard 400W PIM4300 series and 800W PIM4800 series
- ROA1283835 (ABC Module) has room for two 3E Advanced Bus Converters (ABC)
- ROA1283836 (3E POL PI Module) is equipped with six connectors to host through-hole 3E POL
- ROA1285068 (3E POL SIP Module) with eight connectors to host the single-in-line version of the 3E POL
- ROA1285077 (3E POL Paralleling Module) paralleling up to 7 modules for high current up to 280A

*3E stands for: Enhanced Performance, Energy Management, and End-user Value.

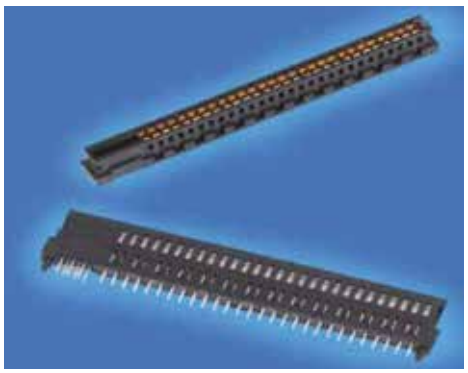


Power Card Edge Low Profile AC/DC Power Distribution Connector System

Features & Benefits
- 7A/contact for multiple contacts at 30˚C temperature rise in still air
- One-piece card edge design enables cost-effective power delivery for 1U and 2U power supplies or power distribution applications
- Low-profile design maximises airflow for system cooling
- Right angle option is available with both power contacts for power distribution and signal contacts for power control
- Integrated power and signal design simplifies board assembly

Target Markets/Applications
- AC/DC pluggable power supplies in data, telecom and datacom/networking
- Industrial PCs
- Industrial controls and instrumentation
- Medical

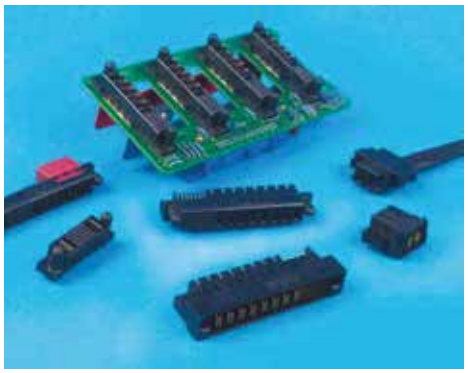
High Power Card Edge (HPCE™) Next Generation Power Card Edge Connector



Features & Benefits
- 9A/power contact beam (with multiple power contacts fully energised) without exceeding a 30˚C temperature rise in still air
- 7.50mm low profile height maximises airflow for effective system cooling
- One-piece assembly enables cost-effective power delivery for 1U and 2U power supplies or power distribution applications
- Highly vented housing design maximises heat dissipation
- Vertical and right angle options are available with both power contacts for power distribution and signal contacts for power control

Target Markets/Applications
- AC/DC pluggable power supplies in data, telecom and datacom/networking equipment
- Industrial PCs
- Industrial controls and instrumentation
- Medical

PwrBlade® Connector System



Features & Benefits
- 48A/individual power contact; 30A/contact for 10 adjacent contacts at 30˚C temperature rise in still air
- 60A/contact using UL test guidelines
- SSI-compliant connector interface for pluggable power supplies and power distribution applications
- Provides power contacts for power distribution and signal contacts for power control

Target Markets/Applications
- AC/DC pluggable power supplies in data, telecom and datacom/networking
- Server System Infrastructure (SSI)-compliant server systems
- Industrial PCs
- Industrial controls and instrumentation
- Medical

PwrBlade®+

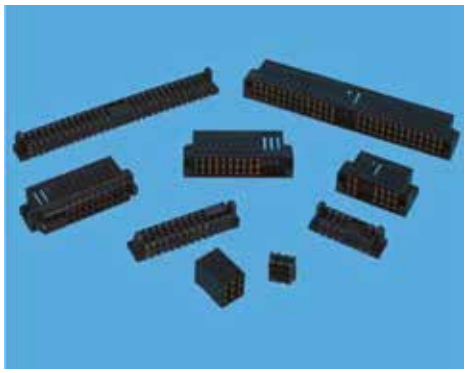
Features & Benefits
- High power contact option (up to 75A/contact; 30˚C temperature rise in still air)
- Low power contact option (up to 49A/contact; 30˚C temperature rise in still air)
- Highly vented housing design maximises heat dissipation for effective system cooling
- Half-bullet guides offer a reduced connector footprint
- Housing material is halogen-free for next generation environmental requirements
- Large operating temperature range (-40˚C to +125˚C) for extreme environments

Applications
- AC/DC pluggable power supplies in data, telecom and datacom/networking equipment
- Industrial PCs
- Industrial controls and instrumentation
- Medical

HCI® Connector System

Features & Benefits

- Up to 82A/power contact; at 30˚C temperature rise in still air 95A/contact using UL test guidelines
- For high-wattage or high current density needs in power supplies and power distribution applications
- Provides power contacts for power distribution and signal contacts for power control
- Number and placement of power and signal contacts are highly configurable for custom power needs



Target Markets/Applications

- AC/DC pluggable power supplies in data, telecom and datacom/networking
- Industrial PCs
- Industrial controls and instrumentation
- Medical

HCI® High Power Backplane/Midplane Connector System

Features & Benefits

- Current rating to 83A/contact without exceeding a 30˚C temperature rise in still air
- Design is compliant with the Hard Metric (HM) Equipment Practice and compatible with the ZipLine®, AirMax VS® and Millipacs® connector series
- Connector housing does not overhang the board edge so the board-to-board spacing can be adjusted if needed
- Two- and three-position modules support backplane or midplane applications

Target Markets/Applications

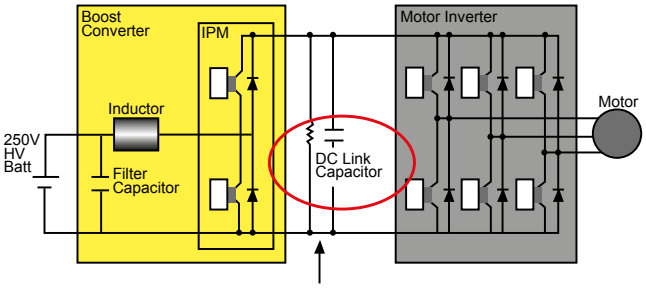
- Data-servers and storage enclosures
- Telecommunications
- Datacom/networking
- Industrial controls and instrumentation
- Medical

Product Family	Base Part Number	Orientation	Description
Power Card Edge	10028886	Right Angle	10P + 24S + 10P, 14P + 24S + 14P, 20P + 24S +20P, 28P + 24S + 28P
	10055090	Right Angle	With AC power port
	10035388	Right Angle	2x14, 2x17, 2x22, 2x25, 2x28, 2x29, 2x31, 2x32 power
	10046971	Vertical	2x19, 2x31, 2x32, 2x35 power
	10046972	Vertical	2x8 power with mounting ears
	10075664	Vertical	2x19, 2x31 power with press-fit tails
	10034908	Straddle Mount	2x19, 2x23 power
High Power Card Edge	10088418	Vertical	56P + 12S
	10096926	Right Angle	56P + 12S
	10107844	Straddle Mount	36P + 24S
PwrBlade	51720	Right Angle	Power + Signal + Power Header
	51700	Vertical	Power + Signal + Power Header
	51760	Right Angle	Power + Signal + Power Receptacle
	51740	Vertical	Power + Signal + Power Receptacle, PwrBlade products are also available for Server System, Infrastructure (SSI Standard)
HCI	10074864	Right Angle	2DC + 16S + 4DC Header
	10074866	Vertical	2DC + 16S + 4DC Receptacle
	10078546	Right Angle	20S + 8DC Header
	10078548	Vertical	20S + 8DC Receptacle
	10065864	Right Angle	10DC + 24S Header
	10065127	Vertical	10DC + 24S Receptacle
	10082091	Right Angle	11DC + 24S Header
	10082093	Vertical	11DC + 24S Receptacle
	10082722	Right Angle	7DC + 24S + 4 DC Header
	10082724	Right Angle	7DC + 24S + 4DC Receptacle
	10084757	Right Angle	14DC + 24S + 14DC Header
	10084759	Vertical	14DC + 24S + 14DC Receptacle
HCI High Power	10078770	Right Angle	1x2 Header w/o integrated guide
	10078768	Vertical	1x2 Receptacle w/o integrated guide
	10087937	Right Angle	1x2 Header w/integrated guide
	10087939	Vertical	1x2 Receptacle w/integrated guide
	10078904	Right Angle	1x3 Header
	10078902	Vertical	1x3 Receptacle

DC Link Capacitors

Features & Benefits
- Products for every power and environment
- Standard, optimised and custom designs
- Decades of experience in power applications and automotive electronics
- Easy-To-Buy-From Philosophy

Applications
- Solar power
- Wind turbines
- Hybrid/Electric vehicles
- Industrial motor drives
- Other power generation



Product Family (KEMET Series)	Form
DC Link	
Wound Film, Std series C4AE, C4DE, C44U	PCB mount box and screw-terminal can, custom
Aluminium Electrolytic (ALS, ALC)	Screw Terminal and Snap In
Speciality and Custom Solutions	
Available upon request – contact your local TTI representative	

C4AE Series High Capacitance Density Capacitors

The C4AE Series offers new 600 VDC and 105˚C ambient temperature ranges as well as smaller case sizes to meet the requirements of modern solar microinverters and inverter-driven LED systems. KEMET's C4AE high capacitance density capacitors are ideally suited for applications that demand high ripple current, extra long life and outstanding quality and reliability capabilities. "Solar inverters, AC motor drives, welding machines, LED lighting and other high-growth markets can all benefit from this product enhancement."

Features & Benefits
- Dielectric: Polypropylene Metallized Film (MKP)
- Reference standard: IEC 61071
- Voltage: 450 –1,100VDC
- Capacitance: 1.5 – 100µF
- Lead space: 27.5, 37.5 and 52.5mm
- Construction: Radial box, 2 or 4 leads
- RoHS compliant

Applications
- Applications that demand high ripple current, extra long life and outstanding quality and reliability capabilities including:
  – Solar inverters
  – AC motor drives
  – Welding machines
  – LED lighting

Part Number Decoding

C4	A	E	G	B	W	4	4	5	0	A	1	w	J
Series			**DC Voltage**	**Case Code**	**Terminals Code**	**Capacitance Code (pF)**				**Variants**	**Terminals Diameter (mm)**	**Case Letter[2]**	**Tolerance**
C4 = MKP Power Capacitors	A = Box – Wire Terminals	E = DC Link	E = 300V G = 450V H = 600V I = 800V J = 700V K = 750V L = 500V M = 850V N = 1000V O = 900V Q = 1100V U = 1300V	B = Box plastic case	U = Single copper wire W = Double copper wire Z = Special wire	Digits 9, 10, and 11 indicate the first 3 digits of capacitance value. Digit 8 indicates the number of zeros that must be added to obtain rated capacitance in pF.				A = Standard B = Special H1 = 100˚C	1 = 0.8 2 = 1 3 = 1.2	0, A, B, C, D, E, F, G, H, J, L, M, N, W, X, Y, 1, 2	J = 5% K = 10%

ALS60/61 Series Screw Terminal Aluminium Electrolytic Capacitors

The ALS60/61 550Volt aluminium electrolytic capacitors have been designed using the latest electrolyte and foil technology to meet the high voltage, high ripple current and long life demands of the electronics industry.

Features & Benefits

- High working voltage: 550 VDC
- Long life, up to 20,000 hours at + 85˚C (Vr, Ir applied)
- High ripple current
- Excellent surge voltage capability

Applications

- Industrial and commercial applications demanding high reliability with long life expectancies including:
  - Frequency converters
  - Inverters
  - UPS systems
  - Switch mode power supplies
  - Traction and welding
- Alternative energy
- Industrial lighting
- Medical
- Transportation
- Defence and aerospace

Ordering Information

Series	Stud Option	Termination	Capacitance Code (µF)	Size Code	Voltage (VDC)
ALS6	**0**	**A**	**561**	**KE**	**550**
Aluminium Electrolytic	0 = Plain can 1 = Threaded mounting stud	See Termination Table	First 2 digits equals first 2 significant figures, 3rd digit is the number of additional zeros	See Dimension Table	550 = 550

Termination Table

Diameter (mm):	51	66	77	90
Termination Code				
A	•	•	•	•
C		•	•	•

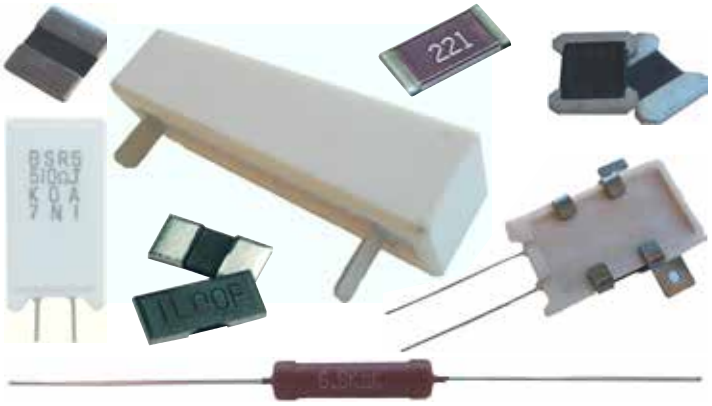
Dimensions – Millimeters

Size Code	Dimensions in mm					
	D	L	LT	S	V	Mounting Stud (M x H)
	±1	±2	±1	±0.5	Nominal	±1
KE	51	82	86.5	22.2	13.7	M12 x 16
KF	51	105	110.5	22.2	13.7	M12 x 16
KJ	51	115	119	22.2	13.7	M12 x 16
KM	51	131	136	22.2	13.7	M12 x 16
ME	66	82	86	28.5	15.8	M12 x 16
MF	66	105	110.5	28.5	15.8	M12 x 16
MJ	66	115	119	28.5	15.8	M12 x 16
MM	66	131	135	28.5	15.8	M12 x 16
MP	66	146	150	28.5	15.8	M12 x 16
NF	77	105	110.5	31.8	19	M12 x 16
NJ	77	115	119	31.8	19	M12 x 16
NM	77	131	135	31.8	19	M12 x 16
NP	77	146	150.5	31.8	19	M12 x 16
QH	90	98	103.5	31.8	25	M12 x 16

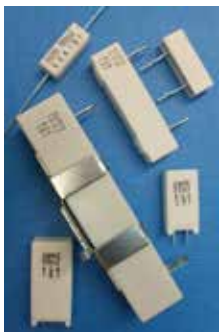
Your Passive Solution

Established 1940 in Japan, KOA Corporation is a leading, innovative manufacturer of passive components with more than 3,000 employees and 24 manufacturing plants. KOA supplies products to all of the world's leading electronics manufacturers.

KOA Europe GmbH which is located in Dägeling/Itzehoe, Germany offers dedicated customer service together with an experienced sales force and local product and application engineers. Our state-of-the-art logistics operations with our own warehouse ensure the customer production lines run smoothly.



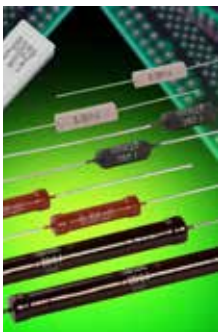
High-Reliability Power Resistors
BGR, BWR, BSR Series



Features & Benefits
- Power ratings up to 40W
- High component and equipment reliability
- Excellent in anti-pulse and inrush current
- Wirewound or metal oxide resistors inside
- Using flame retardant/insulated ceramic case
- Wirewound resistors with ±1% tolerance
- Operating temperatures up to +155˚C

Applications
- Pre-charge/discharge resistor in inverter circuits
- Industrial control circuits
- Power meter, power conditioner
- Solar/wind inverter circuits
- DC-DC converter

Leaded Surge Resistors
CW, RCR, PCF, HPC Series



Features & Benefits
- Full ceramic body resistors for HV and surge current (HPC/PCF Series)
- Wirewound for low R-values and good TCR (CW Series)
- Metal glaze resistors for anti-surge and high continuous voltage (RCR Series)

Applications
- Power supply circuits for industrial fans, machine tools, etc
- Inrush current limiting or HV-dividing
- Medical cables
- Circuit breaker
- Snubber circuits in power conditioner/inverter

Wide Terminal Chip Resistors
WK73 Series

Features & Benefits
- Improved solder joint reliability
- Excellent heat dissipation characteristics
- Superior temperature and power cycling performance
- Low thermal expansion stress
- Higher rated power – less board space
- Tested according to AEC-Q200 requirements

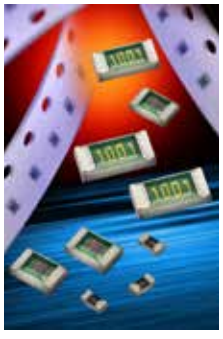
Applications
- Several automotive applications
- Power supplies
- Motor control
- Industrial power control
- Battery management EV/HEV

Low Ohmic Current Sensing Resistors
SL, TLR, PS Series

Features & Benefits
- Resistance values down to 0.5 milliohm
- Power ratings up to 6 Watts
- Tolerance of ±1% is standard
- Stable T.C.R. down to ±50ppm/K
- Operating temperatures up to +170˚C

Applications
- Automotives
- Inverter power supplies
- Current sensing for CPU
- DC-DC converter
- AC adapters
- Inverter circuits
- Power conditioner/smart meter shunt

High Precision Resistors
RN73H Series



Features & Benefits
- Improved moisture and high heat resistance by special resistive film and protective coating
- High component and equipment reliability
- Tight tolerances down to ±0.05%
- Stable TCR down to ±5ppm/K
- Operating temperatures up to +155˚C

Applications
- Automotive ECU inside the engine room
- Industrial control circuits
- Power meter, power conditioner
- Solar/wind inverter circuits
- DC-DC converter

Pulse/Surge Protection Resistors
SG73 (S,P) Series

Features & Benefits
- Excellent in ESD characteristic
- Outstanding pulse proof property
- High component and equipment reliability
- Tight tolerances down to ±0.5%
- Parts for temperatures up to +155˚C

Applications
- Car electronics
- Power supplies
- Industrial robots
- Power meter, power conditioner
- Solar/wind inverter circuits
- Snubber circuits in power conditioner/inverter

Total solution on E-Caps for power electronics application
- Over 37 years, global leading E-Caps manufacturer
- Base in Taiwan, made in China for 690Mio pcs monthly
- Whole product range to fulfill your requirements: lower ESR, higher ripple, longer life

Polymer Products

OVZ –SMD, Super LESR

Features & Benefits
- 105˚C
- 2k hrs
- 22μF – 27,000μF
- 2.5V – 63V

ORZ – Radial, Down Size

Features & Benefits
- 105˚C
- 2k hrs
- 100μF – 2,700μF
- 2.5V – 35V

Note: 125˚C 2K Hrs, 105˚C 5Khrs, also available.

LOW ESR Radials

RZW – LESR, Hi-Reliability

Features & Benefits
- 105˚C
- 10k hrs
- 2.2 – 18,000μF
- 6.3V – 100V

RXQ – High Ripple Current

Features & Benefits
- 105˚C
- 10k hrs
- 6.8μF – 330μF
- 160V – 450V

RXJ – LESR, Long Life

Features & Benefits
- 105˚C
- 5k hrs
- 2.2μF – 4,700μF
- 6.3V – 100V

NOTE: 125dC/5k hrs, 130˚C/3k hrs, also available. Pen-Type of 2k/5k/10k hrs is on ready to supply.

V-Chip (SMD) Lines

Global Leading on Quality/Quantity

VEU – Long Life of Full Range

Features & Benefits
- 105˚C
- 5k hrs
- 1μF – 1,500μF
- 6.3V – 100V

VZH – Low ESR with Large Capacitance

Features & Benefits
- 105˚C
- 5k hrs
- 1μF – 8,200μF
- 6.3V – 100V

VZS – Ultra LESR with High CVs

Features & Benefits
- 105˚C
- 2k hrs
- 22μF – 680μF
- 6.3V – 35V

NOTE: VLV-50G anti-vibration and 125˚C, 2k hrs are available.

Snap-In Power Capacitors

LSR – New Innovated for Power Electronics Application

Features & Benefits
- 105˚C
- 3k hrs up in life
- 56μF – 22,000μF
- 160V – 450V
- Less ESR 30% – 40%
- Higher ripple 30% – 60%
- Reduced temperature raise for 0.5d – 1.0˚C

NOTE: 85˚C/105˚C, 2k, 5k, 7k hrs are all available.

Fuses

Features & Benefits
- Surface mount or axial; glass or ceramic; thin-film or Nano2® style; fast acting or Slo-Blo® fuses
- Current ranges: 0.001A – 40A
- Maximum voltage ranges from 24V – 600V
- Interrupting ratings from 24A – 50,000A
- Comprehensive line of lead-free and RoHS devices

Applications
- Overcurrent protection that will completely stop the flow of electricity for critical circuits

Line Voltage Operation Leaded Varistor (LA Series)

Features & Benefits
- Energy absorption capability (Wtm) up to 360J
- Wide operating voltage range 130V to 1000V
- No de-rating up to 85˚C ambient
- Available in T&R or bulk pack

Applications
- Uniterruptible Power Supply (UPS) • Battery Charger
- Consumer Electronics (peripherals, handheld, video equipment)

Radial Leaded Varistors (C-III Series)

Features & Benefits
- High energy absorption capability WTM 40J to 530J (2ms)
- High pulse life rating
- High peak pulse current capability ITM 3500A to 9000A (8/20µs)
- Wide operating voltage range VM(AC)RMS 130V to 680V
- Available in tape and reel for automatic insertion; Also available with crimped and/or trimmed lead styles
- No derating up to 85˚C ambient
- The C-III Series is supplied in 10mm, 14mm and 20mm disc versions with various lead options

Polyfuse PPTC – Radial Leaded

Features & Benefits
- Fast time-to-trip
- Resettable
- Cured, flame retardant epoxy polymer insulating material
- Meets UL 94V-0 requirements

Applications
- USB hubs, ports and peripherals
- Computers and peripherals
- Motor protection
- General electronics
- Automotive applications
- Industrial Controls (60R Series only)
- Transformers (60R Series only)

TMOV® and iTMOV® – Thermally Protected Varistor Series

Features & Benefits

- Thermally protected with a thermally activated element
- Automatically open circuit when overheating occurs due to abnormal sustained overvoltages
- Integrated thermal activation element means that it will not flame and fragment when subjected to an abnormal voltage condition as would the standard MOV
- UL 1449 3rd Edition certified

Applications

- Power supplies
- Cable modems
- Refrigerators
- Oven applications
- LED lighting

Surface Mount Multilayer Varistors (ML Series)

Features & Benefits

- Leadless 0402, 0603, 0805, 1206 and 1210 chip sizes
- Multilayer ceramic construction technology
- Operating temperature range: -55˚C – +125˚C
- Operating voltage range VM(DC): 5.5V – 120V
- Rated for energy current (8 x 20µs)
- Inherent bi-directional clamping

Applications

- Power supply
- Power control applications
- Signal line applications

TVS Diodes

Features & Benefits

- Designed to suppress overvoltage transients such as EFT, lighting and inductive load switching
- Offer peak pulse power (10µs/1,000µs) ratings from 400W to 30,000W
- Reverse standoff voltages from 5V–512V

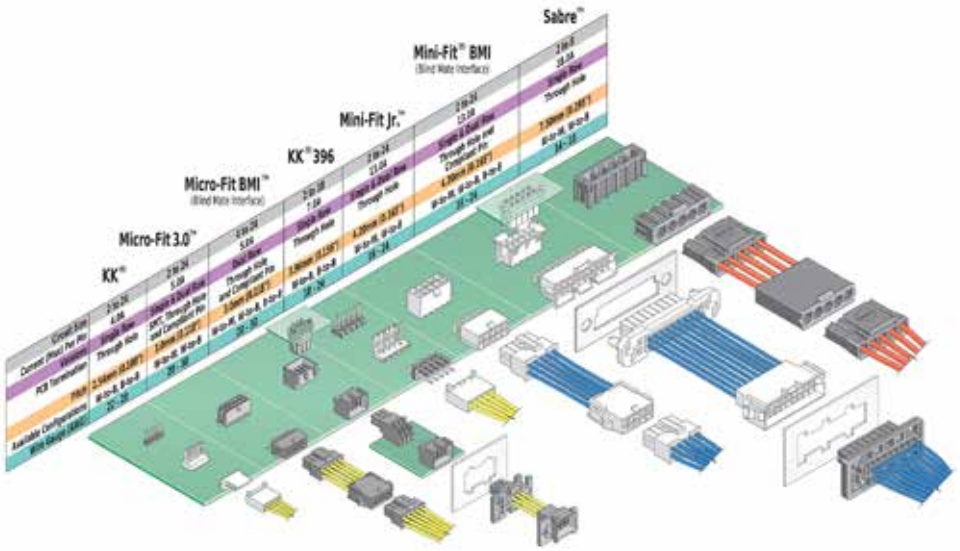
Applications

- Computer
- Industrial
- Telecom
- Automotive equipment

Power Connectors

Molex is uniquely equipped to provide power delivery and power distribution in wire-to-wire, wire-to-board and board-to-board configurations.

Molex's wide selection of power connectors including the popular and proven Mini-Fit®, Micro Fit 3.0™ and KK families will offer designers the ability to realise all their power interconnect needs from one source. Features including blind mate, TPA (terminal position assurance), reflow process compatible headers and positive locking are available. These off-the-shelf connectors can be modified, customised or adapted to meet virtually any application requirement.



KK®

A versatile single row wire-to-board and board-to-board crimp contact system available in 2.54mm, 3.96mm and 5.08mm pitch versions. The vertical and right-angle PCB headers are available with or without polarisation and friction locks. Right-angle, top- and bottom-entry PCB connectors mate with standard headers to facilitate board-to-board configurations. Current ratings of up to 13.0A are achievable in the 3.96mm pitch range by using the MarKK® terminals with their spring box design which provides enhanced reliability across an extended temperature range.

Features & Benefits

- Friction lock headers and housings with locking ramps increase mating security
- Headers with backwalls and housings with polarising ribs prevent mismating
- Secure PCB retention achieved with kinked PC tails
- Various terminal designs with extra contact points are ideal for high-vibration environments
- Custom headers and crimp receptacles available upon request
- Glow-Wire capable versions available

Applications

- Transportation
- Consumer
- Data/communications
- Industrial automation
- Medical
- Networking

Micro-Fit 3.0™

Micro-Fit 3.0™ is a high-density 3.00mm pitch, low-power up to 5.0A per contact connector system enabling both wire-to-wire and wire-to-board configurations with SMT and through-hole options. The system is UL recognised, CSA approved and TUV licensed and features fully isolated contacts and housings with positive lock.

Features & Benefits

- Headers made of high-temperature LCP material withstands high-temperature 265˚C IR reflow processes
- SMT, press-fit or surface-mount compatible versions meet many application needs
- Fully polarised housings prevent accidental mismating
- Positive latching prevents accidental disconnects
- Locking tangs on terminals help prevent terminal back out
- Increased header PCB retention achieved with fitting nails and solderable clips
- Available in Glow-Wire compatible and halogen-free versions
- Reduced mating force (RMF) male and female terminals also available

Applications

- Alternative energy
- Consumer
- Data/communications
- Medical
- Military/aerospace
- Telecommunications

Micro-Fit BMI™

Molex's Micro-Fit BMI™ connectors are designed for hard to reach applications where it is not feasible for the connectors to be seen while engaging/ disengaging, such as in a drawer or fan assembly tray. Mating features permit self-alignment of the connectors, eliminating the need for direct line of sight, and assuring a good interface. Panel mounted plugs and receptacles are available for wire-to-wire applications, while pcb-mounted receptacles and headers permit wire-to-board and board-to-board designs. All versions are available in tin and select gold in 2-24 circuit dual-row versions.

Features & Benefits

- Full range of blind mating w-to-w, w-to-b and b-to-b options
- Compatibility with standard Micro-Fit female and male crimp terminals
- Self-aligning feature moulded into housings allows up to 2.54mm misalignment of connectors
- Fully polarised and fully isolated terminals provide protection to contacts and prevent mismating

Applications

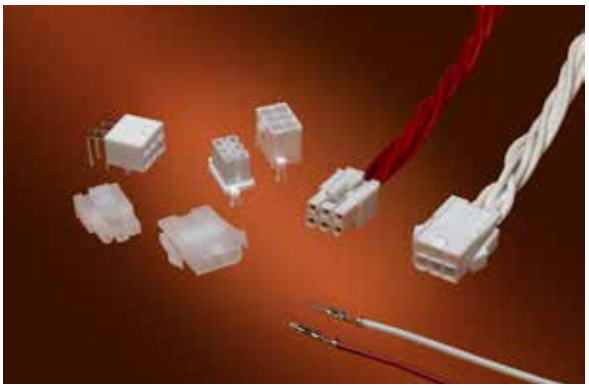
- Alternative energy
- Consumer
- Data/communications
- Medical
- Military/aerospace
- Telecommunications

Mini-Fit Jr.™ Series: 5556, 5557, 5558, 5559, 5566, 5569

The Mini-Fit Jr.™ family is ideal for higher current/higher density applications which require design flexibility for wire-to wire and wire-to-board applications. Available in single- and dual-row configurations from 2 to 24 circuits. Standard terminals facilitate current ratings up to 9.0A per circuit while the Plus HCS (high current system) terminal allows up to 13.0A per circuit.

Features & Benefits

- Fully polarised housings prevent mismating
- Available in wire-to-wire and wire-to-board design flexibility
- Headers are available in vertical and right-angle configurations, with mounting pegs or with screw-mount flanges
- Positive locking with easy operation of thumb latch, assures connectors are fully mated/ prevents accidental unmating
- Receptacles and plugs accept standard Mini-Fit® and Mini-Fit® Plus HCS crimp terminals
- Available in UL94V-0, V-2, Glow-Wire capable and halogen-free materials Ideal for many applications and to meet global material standards



Applications

- Consumer
- Data/communications
- Industrial automation
- Networking
- Medical
- Aerospace and defence
- Automotive
- Commercial vehicle

Mini-Fit® BMI Series: 42474, 42475, 42404, 42440, 42385

Mini-Fit® Blind Mate Interface (BMI) connectors allow misalignment of up to 2.54mm between mating surfaces for easy blind-mate connections in drawer or fan tray type applications. The system features connectors and panel-mount receptacles for vertical and right-angle configurations, in single- and dual-row using standard Mini-Fit® female and male crimp terminals. Also available is the Slide-and Lock™ receptacle version, featuring a thumb latch to facilitate easy panel removal.

Features & Benefits

- Full range of options, including blind mating wire-to-wire, wire-to-board (parallel mounting), wire-to-board (right-angle mounting), board-to-board (parallel stacked boards) and board-to-board (right-angle boards)
- Fully polarised and fully isolated terminals provide protection to contacts and polarisation to prevent mismating
- Full agency approvals for UL, CSA and TUV listed; UL 94V-0 and 94V-2 versions available
- 13.0A current carrying capability* enables higher power capacity in a small package
- Vertical compliant pin (press-fit) header also available
- Tin and select gold plating options available

Applications

- Consumer
- Data/communications
- Industrial automation
- Medical
- Networking

*Using Mini-Fit Plus HCS terminals with 16 AWG wire in 2- and 3-circuit versions

MLX™ Series: 42021, 42022, 42002, 43255

The MLX™ series rated up to 13.5A is interchangeable, intermateable and intermountable with industry standard products. This allows greater flexibility in mating with existing wire harnesses, connectors or PCB headers. MLX connectors are offered in a variety of popular configurations. Housings are moulded in Nylon 6/6 material in UL 94V-2 rating, UL 94V-0 rating and also offered in Glow-Wire Compliant material. The housings are designed for both male and female Molex terminals. Additionally the housings will accept industry compatible terminals. As an added convenience, Molex has provided circuit identification grooves for circuits 2 and 3 along with the industry standard identification rib for circuit 1.

Features & Benefits

- Cross tested to assure industry compatibility
- Positive housing locks eliminate accidental disconnects
- Fully isolated contacts
- Housing will accept male or female terminals allowing design flexibility
- Glow-Wire compatible versions available

Applications

- Commercial vehicle
- Consumer
- Industrial automation
- Networking

Sabre™ Series: 43680, 44441, 43160, 43160, 46007

Sabre™ is a robust high-current, wire-to-wire and wire-to-board connector family with a built-in TPA feature that prevents terminal backout. Crimp terminals are available to suit a wide range of wire guages and insulation thicknesses and terminals are fully isolated. The system is UL recognised, CSA approved, TUV licensed and Glow-Wire compatible.

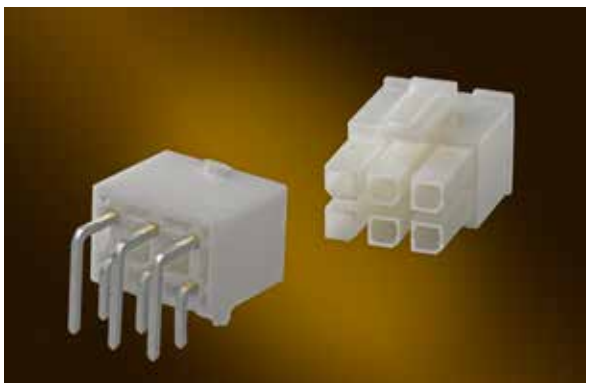
Features & Benefits

- Current rating up to 18.0A at 600V meets requirements for high-current and high-voltage applications
- Positive latch on receptacle housing prevents accidental disengagement with mating plug or header
- Blade-terminal design has four points of electrical contact providing a more reliable electrical connection than circular style terminals
- Right-angle or vertical header configurations offer greater flexibility to match customer-board design requirements
- Female terminals also mate to .125” MEMA PC tabs providing a lower cost one-piece wire-to-board solution

Applications

- Alternative energy
- Consumer
- Industrial automation
- Medical
- Military/aerospace
- Networking
- Telecommunications

Mega-Fit™ Power Connectors



The Molex Mega-Fit™ connector family provides a compact (5.70mm pitch) 2 to 12 circuit dual-row wire-to-board solution for any application where a current carrying capacity of 20.0A is required. The housings and headers are fully polarised and offer fully isolated contacts. The terminals are available in either tin or gold plating.

Features & Benefits

- Carries up to 20.0A per circuit when using 12AWG; also available in 14AWG and 16AWG wire
- Low-profile, 5.70mm pitch
- Terminal has six points of contact
- Positive-locking top latch on housing
- High-temperature LCP housing
- Hot-plug capability option
- UL, CSA and TUV approved and Glow-Wire compliant

EXTreme Power™ Products

The need for high-current power interconnects in increasingly smaller space continues to rise rapidly. Solving this power equation on new architectures and system platforms has been a major focus for Molex's product development teams. The Molex EXTreme Power™ family is the direct result of listening intently to our customer's electrical and mechanical design challenges. Since no two applications are the same, Molex EXTreme Power™ solutions comprise of several product families that cover a wide range of current levels, mechanical envelopes, mating terminations, and configuration choices; giving system designers the ability to maximise their power interconnect needs.

EXTreme PowerPlus™: 30A per blade

EXTreme PowerPlus™ expandable power and signal connector system conforms to the Server System Infrastructure (SSI) open specification. The DPS (Distributed Power Supply) and MPS (Mid-Range Power Supply) versions offer a standard variation of 2 and 11 power blades with a mixed layout of 24 signal pins. Contacts support up to 30A of current. Selection options include any number of power (up to 20) or signal (up to 128) contacts, the ability to place power or signal at different locations, fork lock or screw mount options, AC or DC current (different pitch), guide post options, and standard/long power blades. Molex offers through-hole right-angle headers and receptacles as well as through-hole and press-fit vertical receptacles.

Feature and Benefits

- Rigid tails for Easy PCB insertion
- High-temperature thermoplastic housing material
- Recessed pins-sequential mating (Last-Mate-First-Break) allows hot swapping of power supply units
- Guide pockets (headers) or guide posts (receptacles) for blind-mating
- Shrouded headers prevent contact damage
- Stamped and selectively plated power contacts provide greater electrical reliability

Applications

- Data/communications
- Industrial controllers
- Networking
- Telecommunications

EXTreme LPH™ 45984, 46114, 45985: 30A per blade

The EXTreme LPHPower™ Connector is a mixed, high-current power and signal connector system providing up to 30A per blade. Designed with power blades parallel to the PC board, its extremely low-profile height allows greater system airflow while taking up 53% less space than traditional connectors with the same current rating. EXTreme LPHPower™ can be mated in a traditional two-piece connector system, or as a one-piece receptacle-to-cardedge/bus-bar application.

Features & Benefits

- Low-profile design, 7.50mm height enhances system airflow and provides 127A per linear inch
- Receptacle sides mates to Molex standard LPH plug or an industry standard 1.57mm PCB gold finger card edge
- Rated for current interruption hot-plugging requirements
- Rugged signal and power contacts reduce the potential for stubbing or damage
- Two isolated power contacts per housing bay (top and bottom) allows power and return circuits in a single bay for a total of 60A per power bay

Applications

- Data/communications
- Industrial controllers
- Networking
- Telecommunications

EXTreme PowerEdge™ 45911, 45912, 45719, 45714, 45845, 45844: 40A per blade

EXTreme PowerEdge™ is a one-piece vertical card edge style connector that can be used with either gold finger pc boards, or as a bus bar interconnect for power supply or power distribution applications. A compact high-current power connector, rated at 40A per blade, PowerEdge has the ability to integrate signal pins within the same housing for power/signal hybrid designs.

Features & Benefits

- Connector assemblies available in 2, 3 and 4 segments (2 contacts per segment) of signal circuits or mixed-power and signal circuits
- Isolated contacts on opposite side of connector assembly segments allows for connector combinations of 8 total signal circuits per segment (4 each on the upper and lower side of the segment)
- End-to-end stackable to mate with double-sided card edge lengths of up to 203.2mm
- Press-fit or solder tail terminations
- Power contacts rated for current interruption hot-plugging requirements

Applications

- Data/communications
- Networking
- Telecommunications

EXTreme Ten60Power™ 46436, 46562, 46437: 60A per blade

EXTreme Ten60Power™ is a modular high-current power and signal connector system in a coplanar and right-angle board-to-board orientation. Providing maximum current-to-length ratio and up to 60A per blade, EXTreme Ten60Power connectors are packaged in low-profile housings that enhance system airflow within the power system. Both the plug and receptacle utilise reliable, proven Molex power and signal contact designs.

Features & Benefits

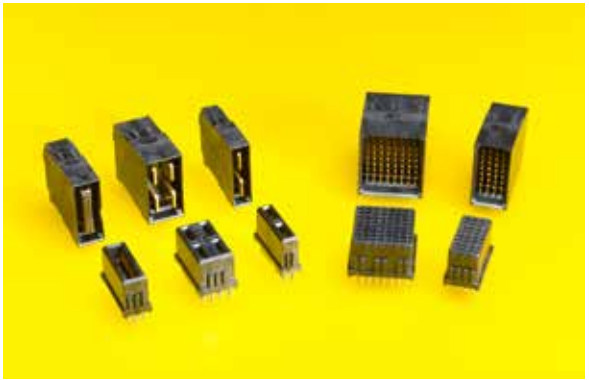
- Low-profile design enhances system airflow and provides 260A per linear inch
- Power blades are rated up to 60A per blade at a 30˚ T-rise providing 260A per linear inch, ensuring maximum current-to-length ratio
- Available in 1 through 10 power-blade modules and 6 through 36 signal modules and either end-mount or top-mount guidance
- Right-angle and vertical mounting available for either coplanar or perpendicular applications
- Meets UL 1977 current-interruption rating for hot-plug applications
- Hybrid power and signal contacts in a single connector for board-to-board applications

Applications

- Industrial controllers
- Networking
- Telecommunications

EXTreme PowerMass™ 75541, 75555, 45840: 150A per blade

EXTreme PowerMass™ is a high-current, board-to-board, modular connector system providing up to 150A per blade (350A per inch). The system offers a nearly unlimited range of power and signal module-design options, providing customer-specific interconnect solutions for AC and DC power requirements. Designed to support power supplies and systems requiring very high-current transfer in challenging and thermal-constrained spaces, EXTreme PowerMass complements Molex's robust power-connector offering.



Features & Benefits

- Multiple power (150A, 80A, 40A) provides maximum flexibility for customer design requirements
- 350A per inch current density
- Less than 1 milliohm resistance (plane-to-plane) at end-of-life provides minimum heat generation with maximum current transfer
- Press-fit and solder-board termination
- Rugged blind-mating capabilities with die-cast or plastic guides
- Modules assembled to metal stiffener assuring true position and flexible module placement
- Sequential power-blade and signal-pin lengths facilitates post-mate and pre-mate options

Applications

- Networking
- Telecommunications

EXTreme Guardian™ 46817, 46818, 46821, 46819, 68790, 111119: 80A per blade

EXTreme Guardian™ header and cable assemblies feature small package sizes with a centreline pitch of 11.00mm. The system supports up to 80A per blade, provides good shielding characteristics in EMI-sensitive environments and includes hot-plugging capabilities and UL safety features.

Headers are available in 2-circuit single-flanged and 3-circuit dual-flanged versions. Cable assemblies are available in 3-circuit straight, shielded and unshielded versions for high-voltage applications and are UL touch-safe. Additionally, the 2-circuit cabled solutions include a straight, right-entry and left-entry unshielded version for space-saving connections to servers installed in confined spaces.

Features & Benefits

- Supports up to 80A per blade (185A per inch)
- Redundant contact design handles up to 600V to support AC or DC high-voltage applications with the lowest feasible voltage drop and I2R (irreversible dissipative power) losses
- Small centreline spacing of 11.00mm reduces PCB footprint compared to legacy power products
- Recessed terminals, First-Mate-Last-Break (FMLB) allows hot-swapping of power units

Applications

- Electric vehicles
- UPS (uninterruptable power supply)
- Data/communications
- High-end servers
- Telecommunications

EXTreme EnergetiC™ 171097, 171098: 100A per blade

The EXTreme EnergetiC™ Connector System is capable of handling up to 60% more current per blade bay than other products on the market, giving customers more current per linear inch. Available in right-angle plug and vertical receptacle configurations, with 4- and 6-blade bays and a 25-signal bay the system can be configured to support a variety of application needs.

Features & Benefits

- High-current system supports up to 100A per blade bay
- Robust, high-current blades rated up to 250V, AC or DC
- Provides 185A per linear inch, ensuring maximum current-to-length ratio and 60% more current per linear inch over competition
- Low-power-loss interface design ensures optimise power savings while preserving the power loss budget
- Available in 4- and 6-blade bays with 25-circuit signal bays and end-mount guidance
- 2.00 by 1.65mm pitch signal spacing
- Multiple mating levels available on power and signal contacts
- Rated for resistance to arc

Applications

- Data/communication
- Networking
- High-end telecommunications equipment

Mini-Fit Sr.™ Series: 042815, 042816, 042820, 042819, 042818, 042817, 043914, 043915, 043980, 042817

Mini-Fit Sr.™ power connectors offer a compact wire-to-wire and wire-to-board high-current system capable of handling up to 50.0A per contact. This single- and dual-row system is UL, CSA and TUV approved. Features include integrally moulded TPAs on single-row products, positive locking and polarised housings across all circuit sizes.

Features & Benefits

- Design flexible connector system of 2 – 14 circuits for AWG #8 – 12 applications
- Meets high amperage needs up to 50A maximum
- Positive lock ensures secure mating
- Integrally moulded TPA on single row connector (TPA is a separate piece, 43980, for dual row) Prevents terminal backout
- Polarised housing design prevents mismating
- First-Mate-Last-Break (FMLB) option provides grounding and ESD protection
- Metal clips for secure PCB retention
- Thermoplastic headers and fully isolated contacts withstand reflow process

Applications

- Commercial Vehicle
- Consumer
- Industrial General
- Medical
- Networking

Best in Class Power Management Solutions, from Discrete Solutions to Modular Designs

Murata offers a comprehensive line up of discrete electronic components, such as: ceramic capacitors, thermistors, EMI/noise suppression filters and inductors and also a wide range of DC/DC converters.

Super Cap, High Power Density Electric Double Layer Energy Device (EDLED): DMF and DMT series

Features & Benefits

- High power compared with conventional battery, high allowable current (up to 10A)
- Compact size, 18.50 x 20.50mm, suitable for portable devices
- High energy (5.5V and 400mF), flexible discharge ability of 500uAh – 2A
- Wide operation temperature range from -30˚C to +70˚C
- Very low equivalent series resistance (ESR), very attractive for specific power assist functions in small form factors
- High reliability, maintenance free energy device with flexible charge and discharge

Applications

- High power peak assist for portable device (type DMF)
- High power backup application (type DMT)

3000A and 3000B Series Low Profile Power Inductors

3000A Series

Features & Benefits

- Inductance Values: 80nH, 100nH, 150nH or 200nH
- Maximum rated peak current is 57A for the 80nH device
- Typical Rdc is only 0.20mΩ

3000B Series

Features & Benefits

- Inductance values of 85nH, 100nH, 120nH, 150nH or 200nH
- Maximum rated current of 78A for the 85nH inductor
- Extremely low Rdc and is typically 0.29mΩ

Applications

- Noise reduction circuits of high frequency and high current applications:
  – Switching power supplies
  – DC/DC converters
  – Voltage regulator modules
- Ideal for designs where available board space is at a premium

15W DC/DC Converter with 16VDC – 160VDC Input Range

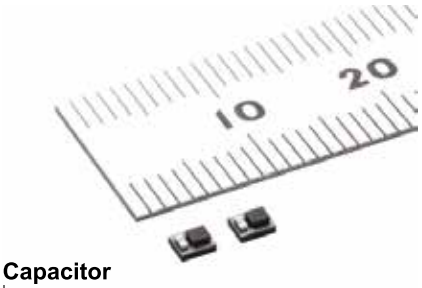
Features & Benefits

- High immunity to input surges
- Externally settable hold up time with additional capacitor
- Input to output isolation complies with the internationally recognised standard UL 60950 for reinforced insulation, with a test voltage of 4kVAC
- Nominal outputs of 5VDC, 12VDC or 24VDC
- Input range: 16VDC – 160VDC

Applications

- Industrial
- Transportation

Ultra-Small Micro DC/DC Converters

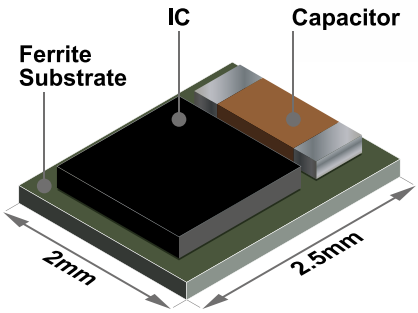


Features & Benefits

- The inductor, a ferrite substrate containing the EMI filter function and a power IC have all been integrated to achieve a small size (The new converters have an on-board footprint that is 60% less compared to when a discrete converter is mounted). Small size: 2.50mm x 2.00mm x 1.10mm
- The wiring connections have been reduced to the shortest possible lengths by integrating the power IC and inductor
- An EMI reduction function has been incorporated to suppress harmonic noise (Radiation noise: 30dB reduction)
- A line-up of converters is available to flexibly accommodate output voltages in a range from 0.80V to 4.00V
- High-efficiency step-down synchronous rectification type, with PWM/PFM automatic switching control

Applications

- Digital still cameras
- Portable media players



Max. height = 1.1mm

Unregulated Dual Outputs

	1kV Isolation		3kV Isolation	5kV Isolation
1W	NKA Series: Vin 3.3V, 5V, 12V; Vout ±3.3V, ±5V, ±9V, ±12V, ±15V; DIP14, DIP8	MTU1 Series: Vin 3.3V, 5V, 12V; Vout ±5V, ±9V, ±12V, ±15V; REDUCED FOOTPRINT, SMD	NTV Series: Vin 5V, 12V; Vout ±5V, ±9V, ±12V, ±15V; SMD	NMJ Series: Vin 5V, 12V; Vout ±5V, ±9V, ±12V, ±15V; SIP7
1W	NMA Series: Vin 5V, 12V, 15V; Vout ±5V, ±9V, ±12V, ±15V; DIP14, DIP8	NTA Series: Vin 3.3V, 5V, 12V, 15V, 24V, 48V; Vout ±3.3V, ±5V, ±9V, ±12V, ±15V, ±24V; SMD	NMV Series: Vin 5V, 12V, 15V; Vout ±5V, ±9V, ±12V, ±15V; DIP14, SIP7	MEJ1 Series: Vin 5V, 12V, 15V, 24V; Vout ±3.3V, ±5V, ±9V, ±12V, ±15V; SIP7
1W	MEA Series: Vin 5V, 12V, 15V, 24V, 48V; Vout ±5V, ±9V, ±12V, ±15V; DIP14, DIP8		MEV1 Series: Vin 5V, 12V, 15V, 24V; Vout ±5V, ±9V, ±12V, ±15V; DIP14, HIGHER EFFICIENCY, SIP7	
2W	NMH Series: Vin 5V, 12V, 24V, 48V; Vout ±5V, ±9V, ±12V, ±15V; DIP14	NTH Series: Vin 5V, 12V; Vout ±5V, ±9V, ±12V, ±15V; SMD	NMK Series: Vin 5V, 12V, 15V, 24V; Vout ±5V, ±9V, ±12V, ±15V; SIP7	NMS Series: Vin 5V, 12V; Vout ±5V, ±9V, ±12V, ±15V; DIP24
2W				MEJ2 Series: Vin 5V, 12V, 15V; Vout ±3.3V, ±5V, ±9V, ±12V, ±15V; SIP7
	Pin compatible	Pin compatible	Pin compatible	Pin compatible

Unregulated Single Outputs

	1kV Isolation		3kV Isolation	5kV Isolation
1W	**LME Series** Vin: 3.3V, 5V, 12V Vout: 5V, 9V, 12V, 15V  SIP4 — 0.25W — DIP8	**MTU1 Series** Vin: 5V, 12V Vout: 5V, 9V, 12V, 15V  REDUCED FOOTPRINT — SMD		
1W	**MEE1 Series** Vin: 3.3V, 5V, 12V, 15V, 24V Vout: 3.3V, 5V, 9V, 12V, 15V  SIP4 — DIP8	**MTE1 Series** Vin: 3.3V, 5V, 12V, 15V, 24V Vout: 3.3V, 5V, 9V, 12V, 15V  SMD	**NMV Series** Vin: 5V, 12V, 15V Vout: 5V, 9V, 12V, 15V  DIP14 — SIP7	**NMJ Series** Vin: 3.3V, 5V, 12V Vout: 5V, 9V, 12V, 15V  SIP7
1W	**NME Series** Vin: 5V, 12V, 15V, 24V Vout: 5V, 9V, 12V, 15V, 24V  SIP4 — DIP8	**NTE Series** Vin: 3.3V, 5V, 12V Vout: 3.3V, 5V, 9V, 12V, 15V  SMD	**MMV1 Series** Vin: 5V Vout: 5V  SIP7	**MEJ1 Series** Vin: 3.3V, 5V, 12V, 15V, 24V Vout: 3.3V, 5V, 9V, 12V, 15V  SIP7
1W	**NKE Series** Vin: 3.3V, 5V, 12V Vout: 3.3V, 5V, 9V, 12V  SIP4 — DIP8	**NMR Series** Vin: 5V, 12V, 15V, 24V Vout: 5V, 12V, 15V  SIP7	**MEV1 Series** Vin: 5V, 12V, 15V, 24V, 48V Vout: 5V, 9V, 12V, 15V  DIP14 — HIGHER EFFICIENCY — SIP7	
1W		**MER Series** Vin: 5V, 12V, 15V, 24V, 48V Vout: 5V, 9V, 12V, 15V  HIGHER EFFICIENCY — SIP7		
2W	**NML Series** Vin: 5V, 12V Vout: 5V, 9V, 12V, 15V  SIP4	**NMG Series** Vin: 5V, 12V, 15V, 24V Vout: 5V, 9V, 12V, 15V, 24V  SIP7	**NMK Series** Vin: 5V, 12V, 15V, 24V Vout: 5V, 9V, 12V, 15V  SIP7	**MEJ2 Series** Vin: 5V, 12V, 15V Vout: 3.3V, 5V, 9V, 12V, 15V  SIP7
3W	**MEE3 Series** Vin: 5V, 12V Vout: 5V, 9V, 12V, 15V  SIP4		**MEV3 Series** Vin: 5V, 12V Vout: 5V, 9V, 12V, 15V  HIGH POWER DENSITY — SIP7	

Pin compatible (SIP4 / DIP8)

Pin compatible (DIP8)

Pin compatible (DIP14)

Pin compatible (SIP7)

Pin compatible (SIP7)

New Nichicon Series, High Voltage SMDs

LR Series

Features & Benefits

- Category temperature: -40˚C – +105˚C
- Dimension: 8x10mm – 10x13.5mm
- Endurance: 3,000hrs
- Rated voltage: 160V – 500V
- Rated capacitance: 2.7µF – 39µF

LT Series

Features & Benefits

- Category temperature: -40˚C – +125˚C
- Dimension: 8x10mm – 10x13.5mm
- Endurance: 2,000hrs
- Rated voltage: 160V – 450V
- Rated capacitance: 3.3µF – 33µF

LV Series

Features & Benefits

- Category temperature: -40˚C – +105˚C
- Dimension: 8x10mm – 10x13.5mm
- Endurance: 10,000hrs
- Rated voltage: 160V – 450V
- Rated capacitance: 3.3µF – 33µF

LH Series

Features & Benefits

- Category temperature: -40˚C – +125˚C
- Dimension: 8x10mm – 10x13.5mm
- Endurance: 4,000hrs
- Rated voltage: 160V – 450V
- Rated capacitance: 2.2µF – 27µF

Applications

- LED driver, power supply units, high-voltage automotive applications (HID/LED ballast) and battery monitoring

New CM Series

Low impedance SMD for high-frequency, smoothing and decoupling circuit.

Features & Benefits

- Category temperature: -55˚C – +105˚C
- Dimension: 4x5.8mm – 10x10mm
- Endurance: 2,000hrs
- Rated voltage: 6.3V – 50V
- Rated capacitance: 10µF – 2.200µF

Upgraded CY Series

Long life, high reliability THT for smart meter, lighting and power supplies.

Features & Benefits

- Category temperature: -40˚C – +105˚C (up to 400V)
  -25˚C – +105˚C (from 420V)
- Dimension: 10x16mm – 18x46mm
- Endurance: 10,000hrs – 12,000hrs
- Rated voltage: 160V – 500V
- Rated capacitance: 6.8µF – 680µF

New NU Series

High voltage screw terminal with special foil for rapid charge-discharge (Nichicon exclusive).

Features & Benefits

- Category temperature: -40˚C – +105˚C
- Dimension: Ø51mm – Ø90mm
- Endurance: 5,000hrs
- Rated voltage: 500V, 525V
- Rated capacitance: 680µF – 8.200µF
- Feature: for high speed charge/discharge

Applications

- Renewable energy (PV, wind)
- Charger
- Industrial power application (harbour crane, robotic, etc.)
- UPS
- Data centre

G3VM-61VY MOSFET Relay

Trigger LED forward current of 1mA (maximum) facilitates power saving designs and prolonged battery life.

Features & Benefits
- High isolation, sensitive and low cost MOSFET relay in special SOP4 pin
- Special SOP4-pin package with dielectric strength AC 3.7kV
- Trigger LED forward current of 2mA maximum
- Facilitates power saving designs and prolonged battery life
- Continuous load current of 70mA

Applications
- Security systems/broadband systems
- Industrial equipment
- Battery powered equipment
- Measurement devices
- Amusement machines

G3VM-61PR MOSFET Relay

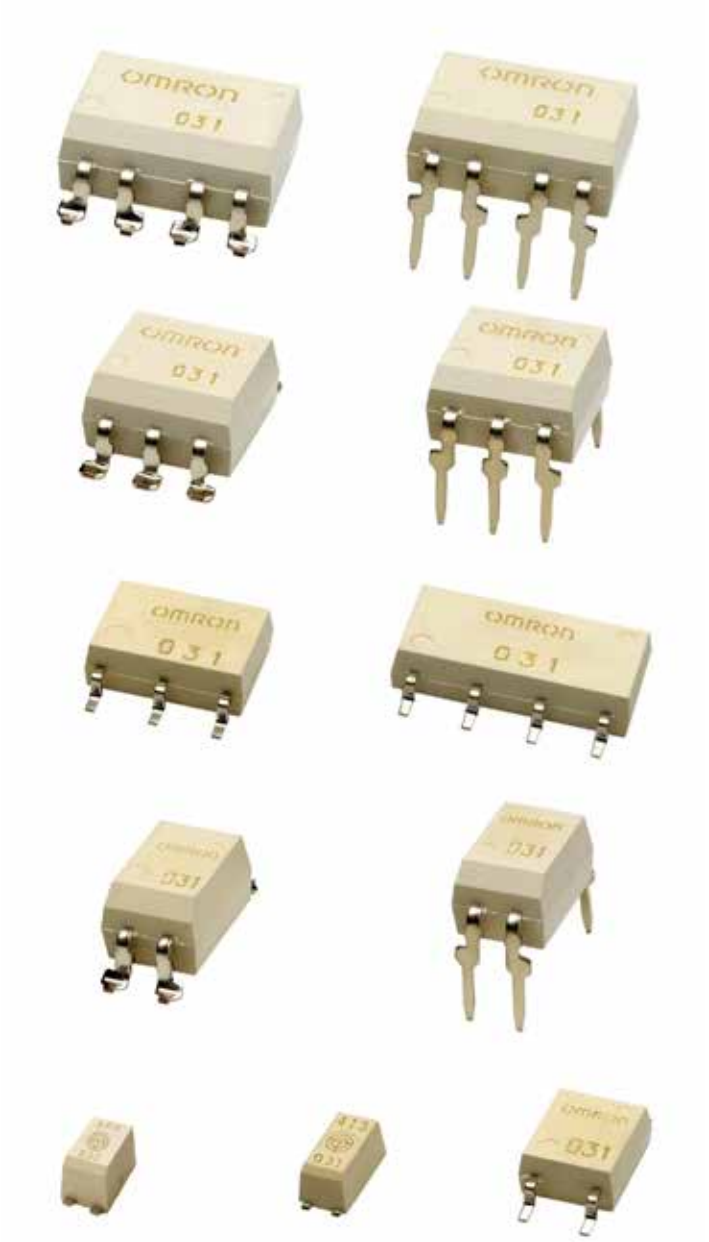
Features & Benefits
- USOP with 60-V load voltage
- 0.4A switching current
- Smallest package in G3VM series
- Saves 17% of mounting space compared to SSOP

Applications
- Security systems/broadband systems
- Industrial equipment
- Battery powered equipment
- Measurement devices
- Amusement machines

G3VM-41HR/61HR/101HR MOSFET Relay

Features & Benefits
- High switching current MOSFET relay in SOP6-PIN
- Higher power, 2.5-A switching with 40-V load voltage, Low 30-mΩ on resistance
- Higher power, 2.3-A switching with 60-V load voltage, Low 40-mΩ on resistance
- Higher power, 1.4-A switching with 100-V load voltage, Low 100-mΩ on resistance

Applications
- Security systems/broadband systems
- Industrial equipment
- Battery powered equipment
- Measurement devices
- Amusement machines



D6F-PH Thermal Flow Sensor

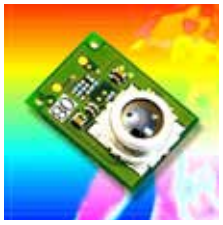
Features & Benefits
- High precision measurement
- High flow impedance to reduce the influence of bypass configuration
- Reduced size increases installation flexibility
- Anomaly detection

Applications
- Heat recovery units
- Variable air volume
- Clogged filter detection

D6T Thermal Sensor

Features & Benefits
- High sensitivity enables detection of stationary human presence
- Unique MEMS and ASIC technology achieve a high SNR
- Superior noise immunity with a digital output
- High-precision area temperature detection with low cross-talk field of view characteristics

Applications
- Temperature control in HVAC systems
- People detection and counting
- Professional lighting



High Power Wide Terminal Resistors – ERJA, ERJB Series

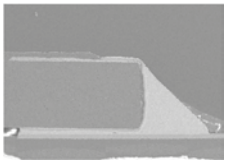
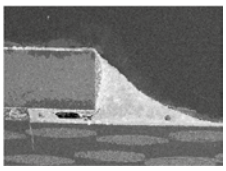
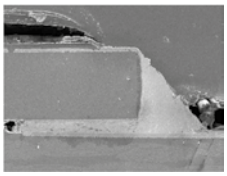
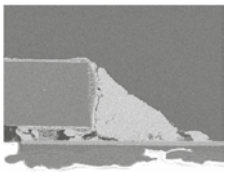
Panasonic's Wide Terminal Resistors are an optimal solution to ensure high power characteristics. Thus electronics design engineers have the chance to either downsize their design or save components of conventional technology resistors.

Furthermore, high solder-joint reliability through a wide terminal structure yielding a reduction in solder-joint cracks. Excellent heat dissipation characteristics through wide terminals and separated resistor structure which yields small and high-power.

Features & Benefits

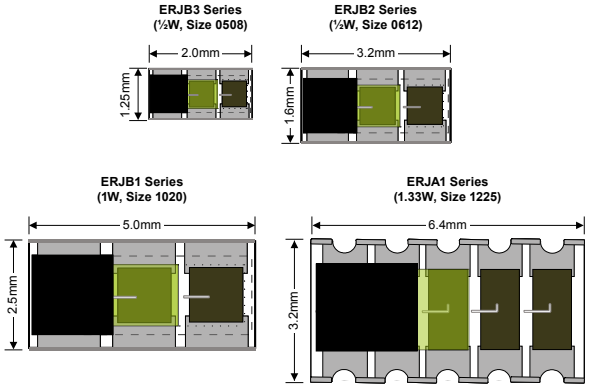
- 0508 (ERJB3), 0612 (ERJB2), 1020 (ERJB1), 1225 (ERJA)
- Power rating:
  – 0508 (ERJB3): 0.5W
  – 0612 (ERJB2): 1.0W
  – 1020 (ERJB1): 2.0W
- Resistance values: ≥ 5mΩ
- TCR: starting ±100ppm
- Resistance tolerance: ±1%, 2%, 5%

Heat cycle test (solder cracking)

	Wide terminal type	Conventional type
1000 cycles		
3000 cycles		

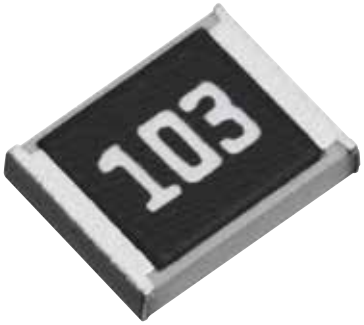
Sample: Wide terminal 1020 (ERJB1),
Conventional type size 2010

Condition : -40˚C ↔ +125˚C (30 min. each), lead-free solder



Part Number	ERJA1	ERJB1	ERJB2	ERJB3
Size (inch)	2512	2010	1206	0805
Power (W)	1.33W	1W 2W (R≤10Ω)	0.75W 1W (R≤10Ω)	0.33W 0.5W (R≤1Ω)
Tolerance (%)	100mΩ – 10kΩ	10mΩ – 10kΩ	10mΩ – 1MΩ	20mΩ – 10Ω
	±1%	±1%, ±2%, ±5%	±1%, ±2%	±1%, ±2%, ±5%
	10mΩ – 10kΩ		5mΩ – 1MΩ	
	±2%, ±5%		±5%	
TCR (x10^{-6}/˚C) (±1% item)	R < 100mΩ: ±350	R < 22mΩ: ±350	R < 22mΩ: 0 – 300	R < 47mΩ: 0 – 300
	100mΩ < R: ±100	R < 47mΩ: ±200	R < 47mΩ: 0 – 200	R < 1Ω: 0 to 200
		R < 100mΩ: ±150	R < 220mΩ: 0 – 150	1Ω < R: ±100
		100mΩ < R: ±100	220mΩ < R: ±100	
Limiting Element Voltage (V)	200V	200V	200V	150V
(Maximum RCWV)				
Maximum Overload Voltage (V)	400V	400V	400V	200V
Category Temperature Range (˚C)	-55˚C – +155˚C			

High Power and Anti-Surge Resistors – ERJP series



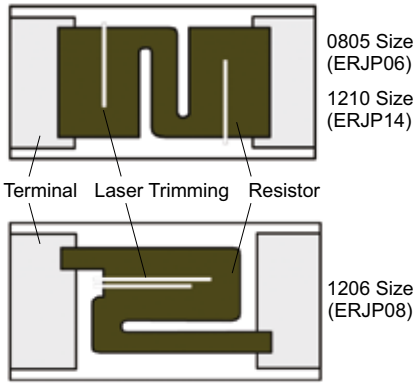
Electronic surge can occur anywhere in a vehicle's electronic circuitry, industrial, measurement and telecom applications. Panasonic ERJP series have great Anti-Surge characteristics and excellent heat dissipation characteristics due to 'Serpentine Resistor Pattern Structure' which helps to decrease electric field strength per unit length. Combined with a variety of small case size Panasonic Anti-Surge Resistors are suitable to replace MELF in plenty of cases. Furthermore, squared sized chip structure help to lead to better solder joint reliability which is perfect for a car's hostile environments.

Features & Benefits

- Serpentine resistor pattern: decreases electric field strength per unit length
- Dispersion of loading heat
- Higher power rating than conventional type
  - 0603 size ERJP03: 0.20W
  - 0805 size ERJP06: 0.4W
  - 0805 size ERJP6W: 0.50W (double sided structure)
  - 1210 size ERJP14: 0.5W
- High pulse resistance
- High ESD resistance
- AEC-Q200

Applications

- Power management
- Automotive
- Switch mode power supply
- AC/DC and DC/DC converters
- Renewable energies
- Lighting, LED
- Voltage regulation modules
- Audio applications
- Motor control
- Telecom applications



Part Number	ERJP14 Series	ERJP08 Series	ERJP06 Series	ERJP6W Series	ERJP03 Series
Size	1210	1206	0805	0805	0603
Power Rating	0.5W	0.66W	0.4W	0.5W	0.2W
Resistance Tolerance	±0.5%, ±1%, ±5%	±0.5%, ±1%, ±5%	±0.5%, ±1%, ±5%	±1%, ±5%	±0.5%, ±1%, ±5%
Resistance Range	10Ω – 1MΩ (±0.5, ±1%) 1Ω – 1MΩ (±5%)	10Ω – 1MΩ	10Ω – 1MΩ	10Ω – 1MΩ	10Ω – 1MΩ (±0.5, ±1%) 1Ω – 1MΩ (±5%)
Limiting Element Voltage (Maximum RCWV)	200V	200V	150V	150V	150V
Maximum Overload Voltage	400V	400V	200V	200V	200V
Category Temperature Range	-55˚C – +155˚C	-55˚C – +155˚C	-55˚C – +155˚C	-55˚C – +155˚C	-55˚C – +155˚C
TCR(X10^{-6}/˚C)	±100 (±0.5, ±1%) ±200 (±5%,10Ω ≤R) -100 to +600 (R<10Ω)	±100 (±0.5, ±1%) ±200 (±5%,10Ω ≤R) -100 – +60 (R<10Ω)	±100 (±0.5, ±1%) -100 – +600 (10Ω ≤R) ±200 (±5%,33Ω ≤R) ±300 (10Ω≤R<33Ω)	±200 (±1%) ±200 (±5%) -100 to +600 (10Ω ≤R)	±150 (±0.5) ±200 (±1%) -150 – -150 – +400 (±5%,<10Ω)

A-FR Series – Super Low ESR and Long Lifetime THT Lytic Capacitor

This series has large capacitance values in a very compact case size.
The very long lifetime in combination with low ESR values and high ripple currents contributes to miniaturisation and high efficiency in various possible applications.

Features & Benefits

- Voltage range: 6.3V – 63V (100V under development)
- Capacitance range: 4.7µF – 8200µF
- Ripple current: up to 3820mArms (105˚C/100kHz)
- ESR/impedance: down to 12mΩ (20˚C/100kHz)
- Endurance: 5000h – 10000h at 105˚C

Applications

- LED and lighting
- Power supply
- Smart meter
- LCD backlight
- Applications which require high efficiency and long lifetime

V-FT and V-FK – Low ESR SMD Aluminium Lytic Capacitors

The remarkable high performance low ESR capacitors of Panasonic correspond to the need of miniaturisation and a boost of efficiency. By means of the V-FT Series downsizing of up to one case size is possible.

Features & Benefits

- Voltage range: 6.3VDC – 100VDC
- Capacitance range: 3.3µF – 2200µF/ (up to 6800uF for large case size)
- Ripple current: up to 1190mArms (105˚C/100kHz)/ (up to 2060mArms for large case size)
- ESR/impedance: down to 80mΩ (20˚C/100kHz)/ (down to 33mΩ for large case size)
- Endurance: 2000h at 105˚C/5000h

Applications

- Automotive
- Industrial equipment
- Power supply
- Applications that require high efficiency and miniaturisation

V-ZA and V-ZC – SMD Conductive Polymer Hybrid Aluminium Electrolytic Capacitor

The merger of aluminium and polymer capacitors combines the advantages of both technologies which result in a highly efficient capacitor. The safety and reliability of the aluminium lytic capacitor boosted with adding conductive polymer for longest lifetimes and highest ripple currents, perfectly suited for high switching frequency applications.

Features & Benefits

- Voltage range: 25VDC – 80VDC (16V is under development)
- Capacitance range: 10µF – 330µF
- Ripple current: up to 2500mArms (105˚C/100kHz)
- ESR range: down to 20mΩ (20˚C/100kHz)
- Endurance, ZA: 10000h at 105˚C, ZC: 4000h at 125˚C
- Leakage current: 0.01CV or 3µA

Applications

- Automotive
- Smart meter
- Information and communication
- Power supply
- LED and lighting
- Applications that require high efficiency, miniaturisation and long lifetime

SP Cap – Conductive Polymer Capacitors (Super Low ESR)

High efficient aluminium based polymer capacitors perfectly suitable for high operation frequencies. Polymer capacitors have very stable characteristics over a complete frequency and temperature range and are a very interesting alternative to tantal and ceramic capacitors.

Features & Benefits

- Voltage range: 2VDC – 25VDC
- Capacitance range: 2.2µF – 560µF
- Ripple current: up to 4000mA (20˚C – 105˚C/100kHz)
- ESR: down to 3mΩ (20˚C/100kHz)

Applications

- Embedded systems
- Industrial PC
- Measurement
- Sensor applications
- Optical
- Camera applications
- Wireless
- RF applications
- Communication
- Infrastructure applications
- Power decoupling
- Battery decoupling

ECQUA – Metallized Polypropylene Film Capacitor (Class X2)

Very high reliability (85˚C/85%/500h loaded condition) as of special pattern Metallization. Fit for series of mains applications, as no influence of corona discharge.

Features & Benefits

- Rated voltage: 275VAC/310VAC*
- Capacitance range: 0.1µF – 2.2µF
- Temperature range: -40˚C – +110˚C

*310V = maximum AC voltage not nominal continuous applied voltage

Applications

- LED and lighting
- Power supply
- Smart meter
- Interference suppressors
- Solar applications
- Home appliance

OS-CON™

OS-CON™ is an aluminium solid capacitor with high conductive polymer electrolyte material. OS-CON™ acquires low ESR, excellent noise reduction capability and frequency characteristics. In addition, OS-CON™ has a long life span and its ESR has little change even at low temperatures since the electrolyte is solid.

Features & Benefits

- Voltage range: 2VDC – 100VDC
- Capacitance range: 3.3µF – 2700µF
- Temperature range: -55˚C/+105˚C, -55˚C/+125˚C
- Endurance*: up to 5000h at 105˚C, 2000h at 125˚C
- ESR: down to 5mΩ
- Ripple current: up to 7200mArms
- Size Ø: 4mm – 10mm
- Height: 4.5mm – 13mm

* 20˚C operating temperature reduction, 10x longer

Applications

As a smoothing, backup and bypass capacitor used in various applications:

- Industrial equipment
- Automotive systems
- Power supplies
- DC/DC converters
- Telecommunication and network

POSCAP™

POSCAP™ is a solid electrolytic chip capacitor. The anode is sintered tantalum and the cathode is a highly conductive polymer. POSCAP™ has a low ESR level and excellent performance for high frequency while maintaining a low profile and high capacitance. In addition, it has high reliability and high heat resistance.

Features & Benefits

- Voltage range: 2VDC – 35VDC
- Capacitance range: 2.7µF – 1500µF
- Temperature range: -55˚C/+105˚C, -55˚C/+125˚C
- Endurance*: 2000h at 105˚C, 1000h at 125˚C
- ESR: down to 5mΩ
- Ripple current: up to 6100mArms
- Size (L x W): 2.0mm x 1.25mm – 7.3mm x 4.3mm
- Height: 1.0mm – 4.0mm

* 20˚C operating temperature reduction, 10x longer

Applications

As a smoothing, backup and bypass capacitor used in various applications:

- Industrial equipment
- Automotive systems
- Power supplies
- DC/DC converters
- Telecommunication and network

MOSFETs

Panasonic MOSFETs are most suitable for DC-DC converter circuits and load switches, featuring the industry's lowest on-resistance by Panasonic's ultra fine processing technology. Fit in a built-in heat sink and power package, these MOSFETs contribute to both higher efficiency and downsizing. For higher and larger power requirements, our power packages provide the solution.

Features & Benefits
- Low on-resistance
- High speed switching
- High heat dissipation package
- Wide variety of package lineup

Applications
- General industries
- Automotives
- Servers and datacentres
- Mobile products

Diodes

Panasonic Schottky Barrier Diodes (SBD) features a fine diffusion process through the adoption of a JBS (Junction Barrier Schottky) structure. By utilising a JBS structure, Panasonic has achieved an industry leading SBD series with Low VF and Low IR. This results in a product that has a smaller footprint, without sacrificing performance. Panasonic offers an efficient, space-saving solution in a thin and small packaging solution.

Features & Benefits
- Thin and small package
- High current and high surge current capability
- Low VF and low IR
- Wide variety of halogen-free packages

Applications
- General industries
- Automotive
- Servers and datacentres
- Batteries/DC-DC converter modules

Metal Composite Power Choke Coils – ETQP Series

ETQP series offer high heat resistance, excellent DC bias characteristic, Hi-BS with ferrous alloy magnetic material and great reliability at high temperatures with a high tolerance for vibration.

These Power Choke Coils also have very low audible noise and are extremely efficient with low DCR and eddy current loss reduction. Metal composite core material, with distributed air-gap, and stamped frame coils on some series provide near linear inductance vs current and do not saturate, while also offering a cost effective design solution.

Features & Benefits
- Non-hard saturation characteristic
- High bias current condition
- Non temperature impact on bias characteristic
- 150˚C/2000h (ETQP*M)
- Outstanding power efficiency with minimised power losses at high frequency (>100kHz)
- Almost half AC resistance above 300kHz compared to ferrite core technology
- Up to 30G vibration resistance
- Low profile (minimum 1.2mm)
- Suitable for high switching frequencies

Applications
- Automotive (engine ECI, start-stop, airbag, ABS, instrument panel etc.)
- DC-DC converter for navigation, instrumentation, entertainment systems etc.
- Motor's noise suppression
- LED drivers
- Embedded computer

Series	Inductance (µH)	DCR (mΩ)
ETQP6M*	1.5 – 4.7	3.2 – 8.7
ETQP5M*	0.33 – 100	1.1 – 348
ETQP3M*	0.68 – 10	6.3 – 81.4
ETQP4W*	1.5	4.0
ETQP3W*	0.33 – 10	3.9 – 93.1
ETQP1W*	0.47 – 4.7	19.2 – 168

PHOENIX CONTACT
INSPIRING INNOVATIONS

Quality is the foundation of the Phoenix Contact philosophy. Our goal is to provide the highest quality products and solutions for a wide variety of applications. Our products, systems and processes are tested to the highest standards in the world to ensure that we meet your most critical requirements.

COMBICON Power

The COMBICON power series of PCB terminal blocks offers a wide range of products and proven connection technology solutions for your most challenging applications.

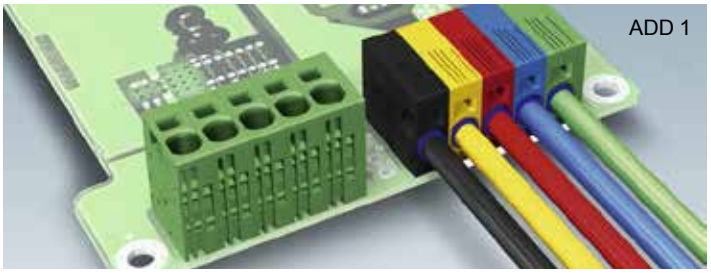
Features & Benefits

- Wire sizes up to 35mm²
- 690V rating
- Up to 125A
- Bridgeable versions
- Integrated test points
- Pin strip mounting available
- THR technology also available for automated processes

We offer the following connection technologies:

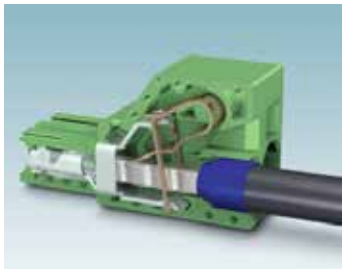
- Screw
- Spring cage
- Push-in
- Push-lock spring

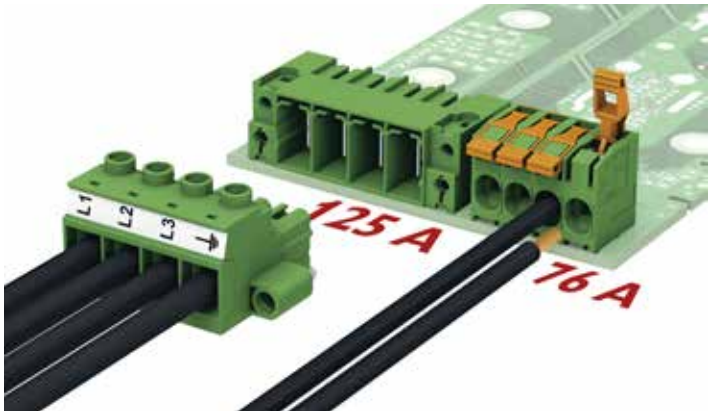
All of our connection technologies are been rigourously tested and field proven to ensure that you are getting the most reliable products available.

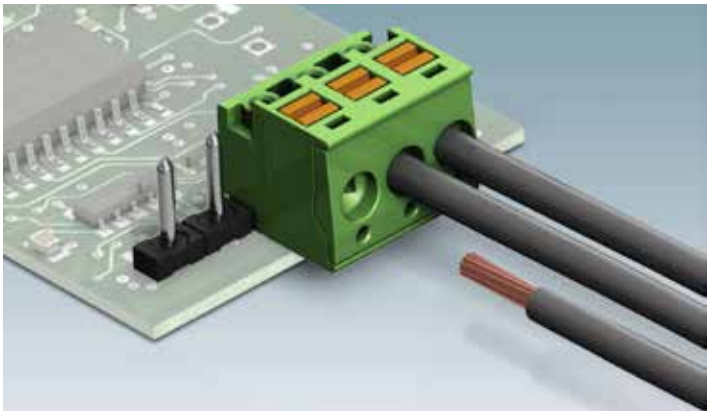


COMBICON High Current Solutions

COMBICON power plug-in connectors provide compact pluggable solutions for power electronics up to 125A.

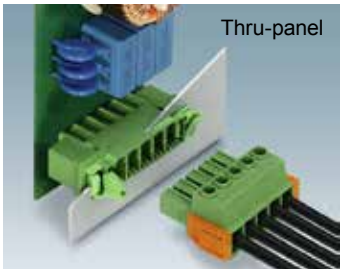


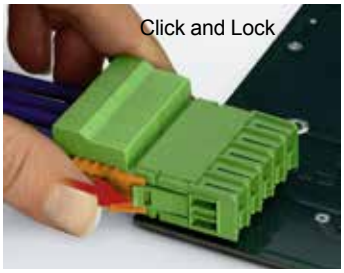




Compact, Secure and Reliable Connections

The Lock and Release lever system automatically latches when inserted that also assists in the connector disconnect process.
COMBICON power connector series also offers the flange systems to ensure a reliable connection even in the harshest environments.





PLUSCON Circular

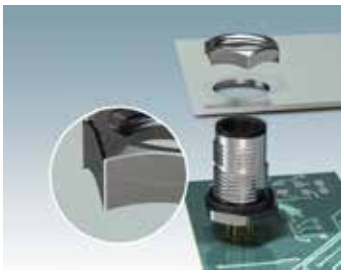
The PLUSCON circular M5 – M12 range of products from Phoenix Contact has been setting the standard for a wide variety of applications.

Features & Benefits

- 12 power ratings of 630V; 12A
- Straight and angled versions
- SAC cable
- IP67 versions
- Packaging options for automatic assembly operations:
  – Tray
  – Tape-on-Reel
- AC and DC power connections
- Encoding options
- Front or rear mounting
- Color contact inserts
- THR or wave solder-able
- Various mounting options
- M12 Hybrid
- Data and power are combined in one connector

Applications

- Industrial automation
- Infrastructure
- Water/waste water
- Railway
- Outdoor installations
- Food and beverage

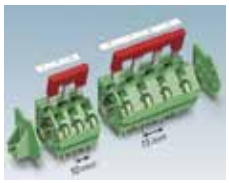


Custom Solutions

Whether yours is a unique colour requirement, special marking need, a specific pole configuration, need of a complete assembly, or a combination of these needs, our Service Centre can provide the solution to meet your particular set of requirements.

Features & Benefits

- Colours: >16 standard available
- Special marking
- Packaging for automatic assembly
- Mounting
- Special package quantities
- Kitting
- Pre-assembly

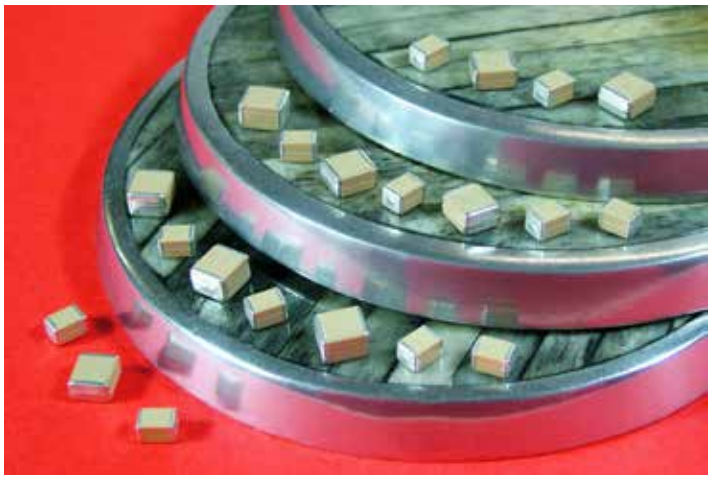


Components for Power Management applications

As a leader in high voltage MLCC technology, Syfer is able to offer a wide range of capacitor and EMI filter products for power management applications, including dc-dc converters, modems, and DC and AC power supplies.

MLCCs include the new space saving StackiCap™, safety certified capacitors, and non-certified types for 250Vac and 114Vac 100Hz operation. EMI filters include the highest capacitance SMD pi-filters available in the market and 200A panel mount low pass filters.

StackiCap™



StackiCap™

Features & Benefits

- Unique patented design increases the maximum capacitance available in a single high voltage MLCC
- Enables dramatic size reduction – in some cases from 8060 – 2220
- 1812 1kV 180nF and 2220 500V 1µF included in the range

Applications

- Power supplies
- Projector modules
- Lighting systems
- Aerospace

200A Feedthrough Filters

Features & Benefits

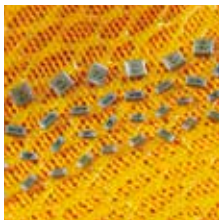
- 200A current capability
- C and Pi-section configurations
- Self-healing plastic film material
- DC and AC versions available
- AC types meet Y2 or Y4 requirements
- Temperature rating: -40˚C – +85˚C

TCC/VCC Capacitor Range

Features & Benefits

- Guarantees a defined capacitance under applied DC voltage across the full operating temperature range
- BX (2X1) and BZ (2C1) equivalents
- Sizes 0603 – 2225
- Capacitance values up to 1.5µF
- FlexiCap™ termination option

Safety Certified Capacitors



Features & Benefits

- Class X1, Y2, X2.
- Sizes 1808 to 2220
- Capacitance values from 4.7pF – 10nF
- FlexiCap™ termination option
- TÜV and UL Approvals

115VAC 400Hz MLCCs

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 Capacitors

Features & Benefits

- Up to 10kV working voltage
- Specialists in high voltage/small case sizes
- Sizes up to 8060
- C0G and X7R dielectrics
- All available in a range or termination options including FlexiCap™ and tin-lead
- Approvals to IECQ-CECC and AEC-Q200

Surface Mount EMI Pi-filters

Features & Benefits

- High performance SMD filters for DC lines, up to 10A rated
- Highest working voltage in the market – 500VDC
- Sizes 1206, 1812 and 2220 with maximum capacitance 470nF
- Suitable for power lines in military, aerospace and telecoms

EPCOS Components for Power Supplies

The extremely broad spectrum of EPCOS components for power supplies covers all types of powerful DC link capacitors and includes an extensive range of transformers, chokes, protection devices, EMC components, and more.

Series		Technical data	Features & Benefits	Ordering code/type
Aluminium electrolytic capacitors				
Capacitors with 4-pin snap-in terminals/ solder pins		385 – 500VDC 390 – 33700µF	Compact can size	B43510, B43520
		350 – 450VDC 390 – 2200µF	Outstanding ripple current capability	B43511, B43521
		350 – 450VDC 390 – 2700µF	Compact can size, 105˚C	B43515, B43525
Snap-in capacitors		85˚C 160 – 600VDC 47 – 2700µF	Long useful life	B43501
			Ultra compact can size	B43601
			Outstanding ripple current capability	B43540
			High voltage	B43541
		105˚C 200 – 450VDC 82 – 2700µF	Ultra compact can size High ripple current capability	B43508
		105˚C 200 – 550VDC 39 – 3300µF	Compact can size	B43504
			Ultra compact can size, 105˚C	B43640
			Ultra compact can size	B43644
			Outstanding ripple current capability	B43544
			Compact can size	B43545
			Very long useful life	B43547
Film capacitors (medium power)				
MKP capacitors		250 – 2000VDC 1nF – 8.2µF	General purpose	B32651 – B32656
		850 – 2000VDC 47nF – 3.3µF	Strap terminals	B32656S
		250 – 2000VDC 1nF – 1µF	High VAC	B32671L – B32672L
		300 – 875VDC 0.47 – 60µF	Very high ripple current Small size	B32674 – B32678
		450 – 1300VDC 1.5 – 110µF		B32774 – B32778
		250 – 400VAC 0.82 – 75µF	Up to +105˚C Optimised AC voltage with small dimensions High ripple current	B32794 – B32798
MKT capacitors		63 – 630VDC 1nF – 220µF	Up to +125˚C	B32520 – B32529
		305VAC 10nF – 2.2µF	+85˚C/85% RH/1000h Connection in series with the mains	B32931 – B32936

Series		Technical data	Features & Benefits	Ordering code/type
Film capacitors (medium power)				
EMI capacitors		330VAC 10nF – 6.8µF	High pulse capability across the line	B32911 – B32916 (X1)
		305 VAC 10nF – 30µF	General purpose across the line UL/ENEC	B32921 – B32928 (X2)
		250VAC 1 – 22nF	Reinforced insulation line to ground UL/ENEC	B81123 (Y1)
		300VAC 1nF – 1µF	Basic insulation line to ground UL/ENEC	B32021 – B32026 (Y2)
MFP capacitors		250 – 3000VDC 1 – 680nF	Very high dV/dt	B32632 – B32634 B32686
Inductors				
SIMID 0603 – 2220		L_R: 1nH – 10000µH I_R: up to 3.51A	- Wide temperature range from -55˚C – +150˚C - Miniaturised versions - High mechanical strength - Suitable for lead-free soldering profiles acc. to JEDEC J-STD 020C - Qualified to AEC-Q200	B82496-C B82498-F B82422 B82432 B82442
Power inductors		I_R: 0.11 – 11.5A L_R: 0.44 – 1000µH	- Shielded and unshielded versions - High current handling capability - Low DC resistance	B82462 B82464 B8247
Leaded RF chokes		IR: 0.02 – 2.5A LR: 1µH – 100mH	- High current handling capability - Low DC resistance - Very good saturation characteristics - Axial and radial leaded versions	B781 B8214
Leaded VHF chokes		I_R: 0.1 – 10A L_R: 1µH – 3900µH	- High current capability - Low DC resistance - Insulating sleeve	B821111 B8213 B82500
Data and signal line chokes		I_R: 0.4 – 1.2A L_R: 0.005µH – 4.7mH	- Suppression of asymmetrical interference coupled in on lines, whereas data signals up to several Mhz can pass unaffectedly	B82793
Current compensated ring core chokes		I_R: 0.3 – 6A L_R: 0.2 – 82mH	- High resonance frequency - Approximately 1% stray inductance - UL and/or VDE Approvals	B82721A/J/K B82722A/J B82723A/J B82724A/J B82725A/J B82726S
Current compensated frame core chokes		I: 0.45 – 2.3A L: 10 – 100mH	- High common mode suppression - High differential mode suppression through stray inductance	B82732F B82733F
ERU Helical wound chokes		I: 12 – 71A L: 0.5 – 35µH	- Very low profile - High rated current - Low DCR - Magnetically shielded	B82559A
NTC inrush current limiters				
S237		R_R at 25˚C: 1 – 80Ω; I_{max}: up to 20A V_{RMS}: 265V	- Limiting of inrush current - Useable in series connections up to 265V_{RMS} - Coated thermistor disk - Cost effective NTC for low power applications - Listed UL 1434	B57237S****M...
S236				B57236S****M…
S464				B57464S****M...
P11				B57211P****M...
P13				B57213P****M...

Series		Technical data	Features & Benefits	Ordering code/type
PTC thermistors				
ICL in phenolic resin plastic case		V_{max}: 260 – 560VAC R_R: 22 ...100Ω C_{th}: 2.3J/K	- Self-protection in case of malfunction of short-circuit relay or internal short circuit of capacitor - For high pulse currents and a high number of operation cycles - Inrush current limiters are nor damaged when directly connected to V_{max} even without additional current limitation	B5910*J0130A020
ICL leaded disks		V_{max}: 260 – 560VAC R_R: 25 – 500Ω C_{th}: 1.0 – 1.4J/K	- Self-protection in case of malfunction of short-circuit relay or internal short circuit of capacitor - For high pulse currents and a high number of operation cycles - Inrush current limiters are nor damaged when directly connected to V_{max} even without additional current limitation	B5975*B0120A070
ICL leaded disks, coated		V_{max}: 440VAC R_R: 120Ω C_{th}: 2.1J/K	- Self-protection in case of malfunction of short-circuit relay or internal short circuit of capacitor - For high pulse currents and a high number of operation cycles - Inrush current limiters are nor damaged when directly connected to V_{max} even without additional current limitation	B59412C1130B070 B59451C1130B070
Limit temperature sensors, chip		Sensing temperature: 75 – 145˚C R_R: 470Ω Tolerance: ±5˚C	- Available in sizes 0603 and 0805 (EIA) - Lead-free tinned terminations	B59721A0… B59641A0…
Temperature sensor probes		Sensing temperature: 60 – 130˚C R_R: <100Ω Tolerances: ±5˚C	- Sensor with epoxy coating and metal tag for easy mounting - Good thermal contact - Short response time	B59901D0…
Overcurrent protection SMD		V_{max}: 30 – 400V R_R: 27 – 1500Ω	- Available in sizes 0603 and 1210 (EIA) - Lead-free tinned terminations - Short response time	B59606A0110A062 B59607A0120A062 B59707A0120A062 B59807A0090A062 B59907A0120A062 B5962*A0090A062
Overcurrent protection leaded		V_{max}: 20 – 1000V R_R: 0.3 – 7500Ω	- Broad product range - Partially UL approval - Paritally VDE approval	B599*5C0***A070 B599*0C0***A070 B598*0C0***A070 B5988*C0120A070 B5975*B01*0A070 B5977*B01*0A070 B5940*B0060A040
Motor protection sensors		R_R: 100 – 300Ω Lead length: 500mm	- Available as single or triple sensors (series connection) - Silver plated and teflon-insulated AWG 26 litz wires - Thermistor pellets with insulating encapsulation - Characteristics and color coding of litz wires conform with DIN 44081, 44081 - Customer specific versions available upon request	B59100M1***A070 B59300M1***A070

Series		Technical data	Features & Benefits	Ordering code/type
Surge Arresters				
EF		DC spark-over voltage: 470 – 2500VDC Max. discharge current (8/20 µs): 10 kA	- High discharge currents - High Insulation resistance - Listed UL 1449 ed. 3 - Application in series with MOV	B88069X4131… B88069X4301… B88069X5080… B88069X5690… B88069X6461...
Varistors				
Disk varistors StandarD		V_{RMS}: 11 – 1100V I_{max}: 1.0 – 8kA	- Approvals: VDE, IEC 60950-1 - Listed UL 1449 3rd ed. type 3 and 2 - No derating up to +85˚C operating temperature	B72205S0… B72207S0… B72210S0… B72214S0… B72220S0…
Disk varistors AdvanceD		V_{RMS}: 130 – 680V I_{max}: 0.8 – 10kA	- Approvals: VDE, IEC 60950-1 - Listed UL 1449 3rd ed. type 3 and 2 - No derating up to +85˚C operating temperature	B72205S2... B72207S2... B72210S2... B72214S2…
Disk varistors AdvanceD-MP		V_{RMS}: 130 – 680V I_{max}: 6kA	- Approvals: VDE, IEC 60950-1 - Listed UL 1449 3rd ed. type 3 and 2 - No derating up to +85˚C operating temperature	B72210P2... B72214P2...
Disk varistors SuperioR		V_{RMS}: 130 – 750V I_{max}: 20kA	- Approvals: VDE; IEC 60950-1 - Listed UL 1449 3rd ed. type 2 - No derating up to +85˚C operating temperature	B72225S4...
Disk varistors SuperioR-MP		V_{RMS}: 130 – 680 V I_{max}: 10kA/12kA	- Approvals: VDE; IEC 60950-1 - Listed UL 1449 3rd ed. type 2 - No derating up to +85˚C operating temperature	B72220P3...
MLV multilayer varistors		V_{RMS}: 5.5 – 150V -55˚C – +125˚C Chip sizes: 0402, 0603, 0805, 1206, 1201, 1812, 2220	- Low leakage current - ESD protection acc. to IEC 61000-4-2 - Rated for energy current (8 x 20µs) - 100% Pb-free and RoHS compatible	B725*T*V9
MLV multilayer varistors New E-Series		-55˚C – +150˚C Chip sizes: 0402, 0603, 0805, 1206, 1201, 1812, 2220	- AEC Q200 - No temperature derating up to 150˚C	B725*E*

DTMOS IV 600V MOSFETs

Offering high-speed, high-efficiency and low-EMI switching the DTMOS IV family of 600V super junction MOSFETs is available in package options that will suit every design requirement. These devices feature an industry-leading $R_{DS(ON)}$*Area and ultra-low C_{OSS} for optimised light load operation, while a reduction in dv/dt leads to a lower tendency to ringing. Recent developments include extended package options and MOSFETs with an integrated fast body diode.

Features & Benefits

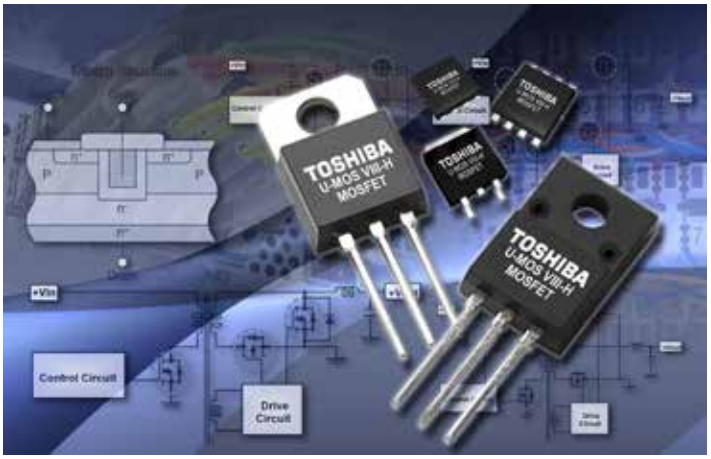
- 600V MOSFETs built on deep trench technology
- Low $R_{DS(ON)}$*Area
- Less temperature dependency of RDSon
- Low COSS
- Optimised dv/dt control by C_{gd}
- Less tendency for ringing
- Devices with built-in fast body diode

Applications

- SMPS
- Lighting ballasts
- PFC
- Fan motor
- PV inverter

UMOS VIII Low-Voltage MOSFETs

Toshiba's UMOS VIII family of low-voltage MOSFETs combines ultra-high-efficiency operation with high-speed switching. Compared with previously commercialised U-MOS technology, U-MOS VIII-H offers $R_{DS(ON)}$ ratings that are less than half for the same die area. In addition, a 60% reduction in the $R_{DS(ON)}$*C_{iss} figure of merit supports significantly improved efficiency levels at light loads while maintaining high efficiency levels at heavy loads. The latest developments include a comprehensive range of SMD UMOS VIII MOSFETs that includes compact SOP Advance, TSON Advance, PS-8 and LGA packages ideally suited to high component density DC-DC conversion designs.



Features & Benefits

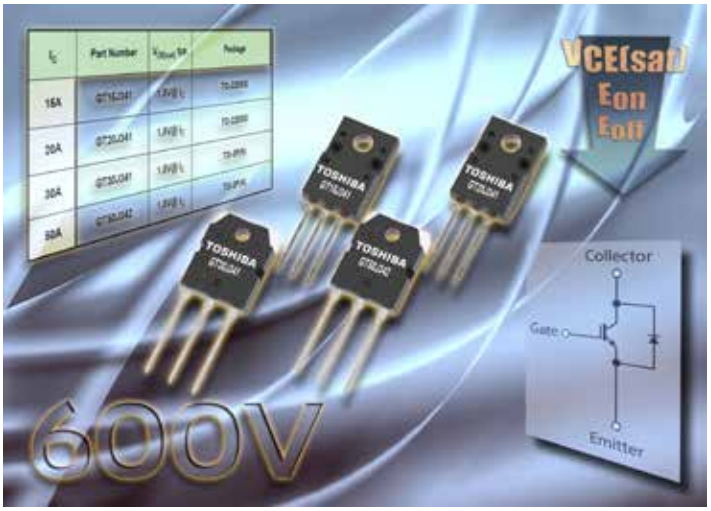
- Best in class $R_{DS(ON)}$*C_{iss} characteristics
- Reduced $R_{DS(ON)}$*Area
- Improved light load efficiency
- Low gate capacity ratio (C_{gd}/C_{gs}) protects against low side self-turn-on
- New range of SMD package options

Applications

- AC-DC power supplies
- DC-DC converters
- Motor drives

Discrete IGBTs for Hard Switching

Toshiba's sixth generation IGBT technology for hard switching applications uses a finer pattern design and a thinner wafer process to further optimise E_{off}-$V_{CE(sat)}$ trade-off, increasing efficiency and improving performance. New sixth generation products offer current ratings of 15A (GT15J341), 20A (GT20J341), 30A (GT30J341) and 50A (GT50J342). Each integrates the IGBT and a fast reverse recovery diode connected between emitter and collector in a single, compact package. All feature a typical $V_{CE(sat)}$ of 1.5V at the nominal current. The 15A and 20A parts are supplied in an isolated TO-220SIS package, while the 30A and 50A devices are available in a non-isolated TO-3P(N) (TO-247 equivalent) package.



Features & Benefits

- Compact 600V IGBTs
- 15A – 50A
- Improved switching loss/conduction loss trade-off
- Integrated free-wheeling diode

Applications

- Motor drives
- UPS

*According to a survey by Toshiba. (As of December 2012)

Power Triple Lock Connector System

The Power Triple Lock connector system has an extensive family line, ranging from free hanging and panel mount receptacles to future products such as board mount headers to meet everyday design needs.

Features & Benefits

- Ensures contacts are fully seated while providing an added measure against contact backout with optional Terminal Position Assurance (TPA)
- Provides cap and plug mating confirmation with audible latch
- Eliminates wire snags with ribs designed to protect the latch
- Ensures connector system engagement in high vibration applications with optional Connector Position Assurance (CPA)
- Helps prevent mis-mating during assembly with keying and color coded housings
- Offered in three levels of housing materials supporting a variety of application requirements
- Supports a broad range of design needs with product breadth including free hanging and panel mount receptacles

Applications

- Household appliances
- Automotive
- Commercial building
- HVAC
- Industrial machinery
- Rail

MOTORMAN Hybrid Connectors

This innovative connector allows for decentralised automation and can lead to a more efficient, energy-saving industrial production line. The MOTORMAN hybrid connector eliminates the need for multiple cables and connectors by offering a solution that integrates signal and power transmission with two high speed Ethernet communication sockets offering the full benefits of real-time automation control, while reducing cabling complexity.

Features & Benefits

- Compact design allows for efficient use of space
- Satisfy power, signal and communication needs in one compact connector
- Robust contact system to help minimise effects of impact and vibration
- Spacious, side internal access assists easy and safe configuration
- Sealing element covers cable diameters from 13mm to 17mm (IP65)
- Contacts may be mounted selectively allowing for design flexibility

Applications

- I/O connector for decentral servo motors
- I/O connector for AC servo motors
- Drivers (amplifiers)
- Industrial packaging, assembly, woodworking or food processing machines

Heavy Duty Connectors

TE Connectivity has knowledge in developing and manufacturing heavy duty connectors for more than 50 years. Originating from the German company HTS, specialist in industrial connectors, and combined with innovation of TE Connectivity, product is being sold worldwide in the markets industrial machinery, railway and electrical power utilities.

Features & Benefits

Housings:

- Aluminium and zinc die cast alloy
- Protection class: IP44 – IP69
- Locking systems
  - Locking clip
  - Side clip
- Powder coated surface

Contact Inserts:

- Thermoplastic, glass-fibre reinforced according to UL 94 V-0
- Rated current: up to 16A
- Rated voltage: up to 500V
- Types of wire connections
  - Screw terminal
  - Spring clamp terminal
  - Crimp terminal
- Contact material
  - Copper alloy
- Contact surfaces
  - Silver-plated
  - Gold-plated
- UL, CSA, VDE approved

Applications

- Industrial:
  - Production equipment
  - Material handling
  - Forklifts
  - Robots
  - Motors
  - Control cabinets
  - Monitoring (HMI)
- Rail

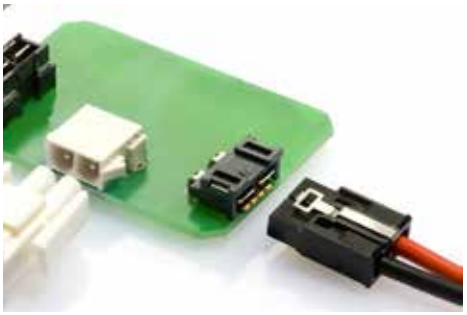
ET Power Connectors

Features & Benefits

- Cost effective solution for cable to board power distribution
- Low profile will fit 15.00mm rack unit spacing
- Various cable diameters support through a variety of contacts
- Wave flow solderable PCB connectors
- Up to 37.50A per contact
- Low profile ≤ 8.00mm
- Cable size from 2.50mm^2 up to 6.00mm^2
- Positive latch retention
- Pick and place PCB version
- PCB hold downs

Applications

- Power distribution units
- Core networks
- Cellular base stations servers
- Storage and network power systems
- Industrial control
- Household appliances
- Industrial and telecom power supplies
- Medical equipment
- Telecom power equipment
- Instrumentation



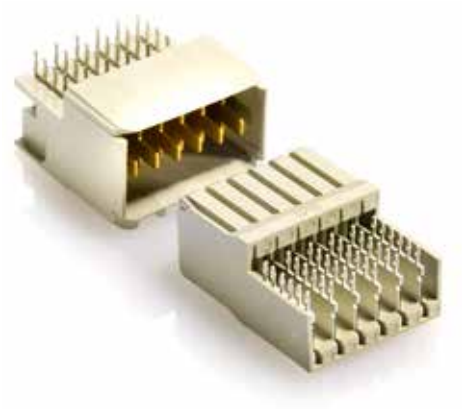
Universal Power Modules (UPM)

Features & Benefits

- Specifically design to complement hard metric board to board backplane interconnects
- Generous alignment features and optional guiding hardware make these connectors ideal for blind mating applications
- Various versions available including standard, high current, low profile and slim
- Available in 3 contact to 12 contact variants
- R/A and vertical board connectors
- Standard 10A and high power 16A per contact
- Meets IEC 60950 touch-safe requirements
- Hot-plug design
- 3 Sequence levels available
- Design to compliment most 2.00mm hard-metric backplane connector

Applications

- Modular hot swap power supplies used in computer
- Telecommunications
- Suited for Telcordia Technologies Inc (Bellcore) GR1216 applications
- Medical and industrial applications
- Computer and peripherals
- High end midrange servers
- High-speed custom platforms
- Mass data storage
- Servers/blade servers
- Routers
- Data storage
- Power supplies



ICCON Power Connectors

Features & Benefits

- Durable, high current power interconnection for space constrained applications with quick connect/disconnect function
- Use with MBXL to reduce PCB footprint
- +/-1.50mm, for blind mating
- Board, cable and bus bar mounting
- 50A current rating
- 2 ports vertically stacked to preserve real estate
- 3 sequencing pin lengths
- Slim line version with 30% smaller footprint available
- Press fit and solder tail mounting options.
- High current density > 200A inch
- Fits same vertical space of new high speed backplane connectors
- Uses high-performance crown contact

Applications

- Power distribution: board to board interconnection
- Board to bus bar interconnections
- Board to wire interconnection
- Motherboard to daughterboard power distribution
- Compatible with many popular two-piece backplane connector systems

AMP Power Series Connectors

Features & Benefits

- Single-pole and 2-pole (battery) quick connect disconnect connectors
- Voltage rating: 600VAC/DC
- Color-coded housings, UL 94V-0
- Hermaphroditic (genderless) housings reduce inventory
- Modular, single-pole housings are stackable in four directions
- Polarity (+ and -) moulded into 2-pole housings promotes proper wiring
- Mechanical keys help prevent two different colorcoded housings from mating
- Stainless steel retaining springs secure contacts in housings
- Stamped and formed, open barrel contacts (6AWG – 20AWG) on reels for automatic and semiautomatic machine termination
- Loose piece, cold-headed contacts (6AWG – 300MCM) for manual and hydraulic hand tools; reducing bushings accommodate smaller wire sizes
- Compatible with industry standard crimp tooling from Pico Corporation
- Connectors intermateable with similar connectors from other manufacturers

Applications

- AC/DC power supplies and charging systems
- Rechargeable batteries
- Material handling equipment (eg forklift trucks)
- Electric vehicles (eg golf carts, sweepers, wheelchairs)
- Office furniture/panels
- Amateur emergency
- Radios and industrial equipment

RAPID LOCK

Features & Benefits

- Fast, reliable replacement for power lugs/ threaded studs
- No installation tools required
- No loose nuts, which means no fretting or heat rise
- Compact design
- Fast installation
- Snap lock retain the terminal without additional hardware
- Up to 250A per contact
- Low contact resistance
- Right angled orientation allows compact wire routing
- Wire sizes from 2.50mm^2 – 9.50mm^2
- Color coding available
- UL certified

Applications

- Power distribution units
- Power supply units
- Power distribution in core networks
- Cellular base
- Stations servers
- Storage and network power
- Systems
- Industrial control
- Direct bus bar connections
- High end computing
- Networking

Surface Mount Power Resistors – Type SM Series

Features & Benefits

- Replaces traditional leaded resistors
- Wide resistance range and choice of 1% or 5% tolerances
- True moulded construction with welded terminals giving robustness
- Flat surface allowing repeatable pick and place operations
- Suitable for reflow soldering and infrared
- 2W rated at 300V operating voltage, 3W rated at 500V operating voltage
- Less than 1% change in resistance at 5 times overload for 5 seconds
- Resistance range from R10 to 2M0
- Low profile design

Applications

- Dissipates energy within an electrical circuit, used in the control circuitry of power supplies

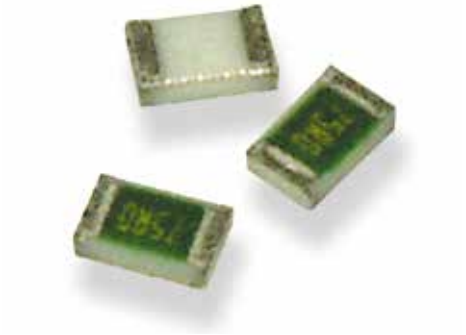
RN73, RP73 and CPF Series – Surface Mount Precision Resistors (Thin Film) Type CPF Series, Type RN73 Series

Features & Benefits

- Wide resistance range and choice of 0.1% to 1% tolerances
- Range of TCRs from 5ppm to 50ppm
- Tape and reeled
- Suitable for reflow soldering and infrared
- Thin film technology giving very high stability
- Available from 0402 size to 2512 package
- RP73 series offers higher power and higher operating temperature
- Tolerances down to 0.01% on selected ranges

Applications

- Used to enable precise input voltages to critical components within the circuit, used in the control circuitry of power supplies



CROWN LINE Power Bus Bar

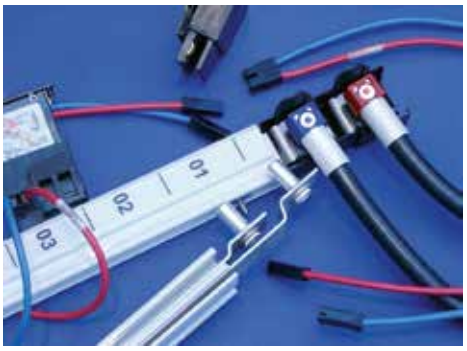
This unique finger proof design is designed to reduce assembly time, give repeatable low impedance electrical performance and reduce wiring errors with pre-determined input/output connections. System thermal characteristics are improved with the use of flat copper conductors allowing better airflow and reducing current skin effects compared to conventional use of large AWG cables.

Features & Benefits

- Low voltage drop
- Multiple contact points
- Low temperature rise
- Maximum contact surface area
- High cycle durability

Applications

- Equipment cabinets
- Telecoms base stations
- Computer servers
- Storage systems
- Industrial applications



Universal MATE-N-LOK

The Universal MATE-N-LOK connector system is a robust and highly reliable connector system that utilises a combination of pins and sockets intermixed in the plug and cap housings to achieve the maximum electrical performance in a .250” [6.35mm] centerline pitch. It features positive polarization, positive locking and rear cavity identification in every housing allowing for easy, error proof assembly. The contacts are completely enclosed in housings, have low mating force and are removable to maintain flexibility in the system.

Features & Benefits

- .250 [6.35] centreline
- 600VAC or VDC, 19A maximum
- 30AWG – 10AWG wire range
- Available in tin or gold plating
- 2 – 10 in-line positions
- 6, 9, 12, 15 matrix
- Wire-to-wire: 1 – 15 positions
- Wire-to-board: 2 – 15 positions
- Available in vertical and right angle headers
- Available in a sealed version and bulkhead version

Applications

- Appliances
- HVAC systems
- Power supplies
- Fan modules
- Lighting
- Wiring harness assemblies

Metal Hybrid PPTC (MHP)

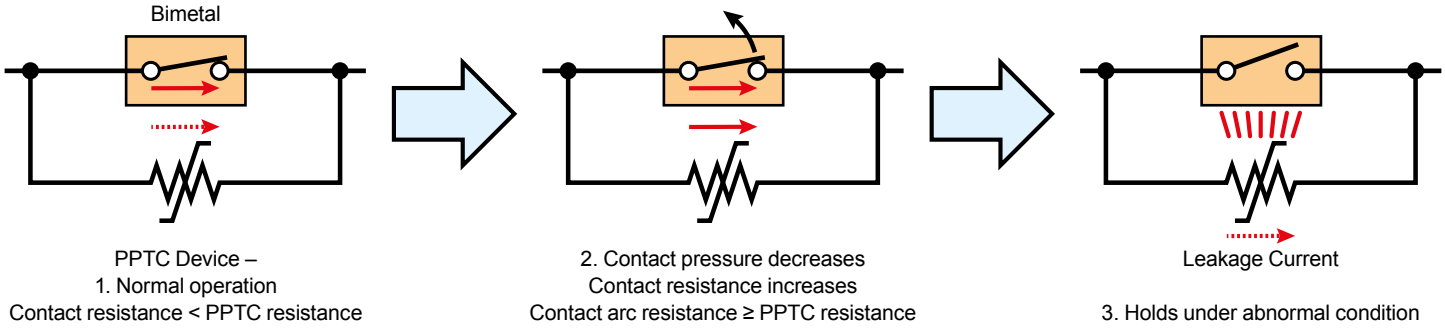
Devices Resettable Circuit Protection for High-Rate-Discharge Li-ion Battery Applications

Features & Benefits

- Fills market need for battery protection devices rated above 30A and 30VDC
- Provides resettable over current and short circuit protection in Li-ion battery packs damage due to abnormal high currents that could cause heat damage and lead to premature cell end of life and potential field returns
- Arc suppression: Current shunts to the PPTC due to its low resistance helping to suppress arcing all while helping protect the contacts from damage or welding shut
- 30A hold current
- Rated at 36VDC, 100A Max.
- Low device resistance (<2mΩ) compared to other breaker devices
- Able to withstand heavy vibration and impact
- Device allows easy mounting between 18650 cells

Applications

- Li-ion battery packs for high-rate discharge applications:
  - Cordless power tools
  - E-bikes
  - Back-up power supplies (UPS)
  - Back-up power for medical devices
- Motor protection



Reflowable Thermal Protection (RTP)

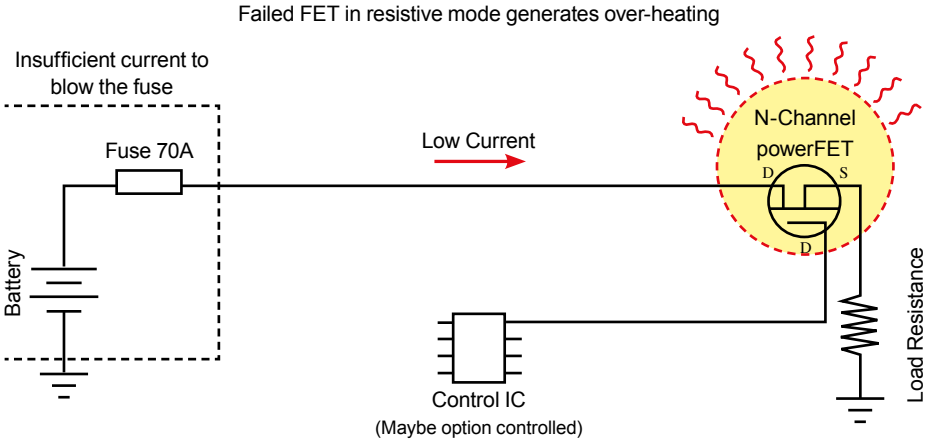
Device for Automotive HVAC and Cooling Fan Systems

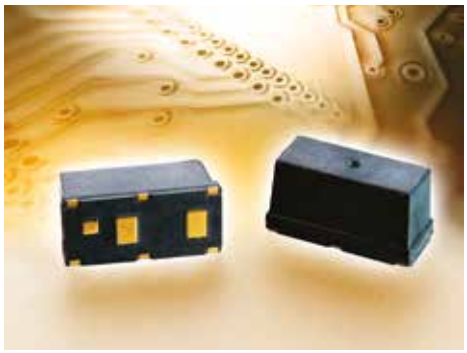
Features & Benefits

- Opens at temperature below critical thermal threshold
- Compatible with up to 3 Pb-free solder reflow processes with peak temperatures up to 260˚C
- Low series resistance
- DC interrupt voltage capable
- Robust design for harsh environment tested per stringent qualification specification
- RoHS compliant, lead and halogen free
- Helps prevent failed components from smoking and or de-soldering in case of a thermal event
- Allows use of standard surface-mount production methods with no special assembly costs
- Low power dissipation and voltage drop
- Green design

Applications

- Helps provide protection against thermal runaway for powerFETs and other components if failure occurs in applications such as automotive HVAC, ABS, power steering, DC/DC converters, PTC heaters, etc. or IT servers, telecom power, converters, etc.
- Other DC thermal protection
- Supports DC electronic circuits
- Suitable for rugged environment applications (automotive and industrial)





PowerFET failure in resistive mode can lead to unsafe overtemperature conditions.

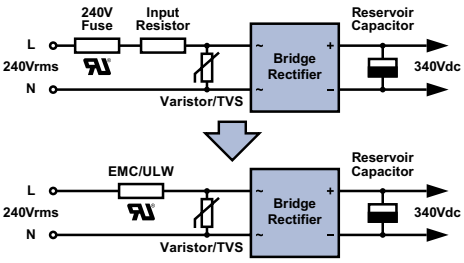
TT electronics has a wide portfolio of products for designers of power management circuits. This includes industry-leading magnetic components for energy transfer and filtering, together with resistors for UL recognised fusing and surge protection.

Passives

ULW: UL Recognised Fusible Mains Input Resistor

Features & Benefits

- UL1412 recognised fusible resistor
- Failsafe mains fusing at 120/240V
- Inrush and surge withstanding
- UL 94-V0 flameproof coating
- SMD leadform option



Current Sense Resistors

OARS Series

Features & Benefits

- J-lead flexible SMD shunt
- Resists PCB flex and temperature cycling
- Dissipates heat to the air, not to the PCB
- Defined high surge energy ratings

LRF3W Series

Features & Benefits

- Inverse form ceramic chip SMD shunt
- 3 times greater power rating
- Wide terminations minimise temperature rise

LRMA Series

Features & Benefits

- Metal alloy SMD shunt
- Values from 500µΩ to 100mΩ
- Manganin alloy for low thermal emf error
- Ideal for high current surges

WPRT: Wirewound Power Radial Terminal Resistors

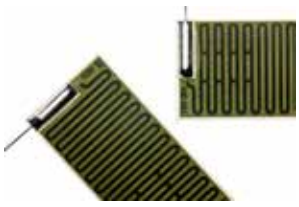
Features & Benefits

- AEC-Q200 qualified
- 10 to 50W power range
- Up to 250W overload
- Quick connect or soldered tags
- Optional mounting bracket
- Flameproof construction

CDR: Capacitor Discharge Resistor

Features & Benefits

- Non-contaminating materials (metals, glass, ceramic)
- Voltage ratings to 20kV
- Overload ratings to 150W for 90s
- High mechanical strength terminations
- Compact planar format saves space in capacitor assemblies
- Enables high reliability compliance to IEC 60871-1 (75V within 600s) or ANSI C37.0731 (50V within 300s)
- Large surface area gives effective heat transfer to fluid giving low hotspot temperatures
- Reinforced termination joints permit capacitors to meet demanding shock and vibration requirements
- Absence of porous materials, flux residues and contaminants ensures compatibility with dielectric fluids



WHS: Wirewound High Surge Resistor

Features & Benefits

- High surge energy winding design
- Energy capacity 2 to 3 times greater than for standard wirewound
- High power and overload ratings
- UL94-V0 flameproof coating
- Range of leadforming options including SMD Z-form
- Optimised surge performance reduces field failure costs
- High energy density can save PCB area and avoid multiple component solutions
- An off-the-shelf, surge rated solution avoids engineering costs involved in the creation of custom products

Magnetics

HM72B

Features & Benefits

- Highly efficient surface mount power inductor featuring an extremely robust design
- Pressed powdered iron alloy core construction allowing it to withstand environmental elements
- HM72B series inductor is available only in 6.80mm x 7.23mm package
- Used in industrial and automotive markets

Discretes

SML05SC06DLCC3 – SiC DLCC Lightweight Surface Mount Packaging

Features & Benefits

- Lightweight packages
- High temperature operation (230˚C)
- High performance design for smaller designs and increased power
- Improved switching and high frequency die for improved efficiency
- Grounded LID for antistatic and deep dialectic protection
- Fully screened parts available
- Less cooling, harsher environments, new applications
- High performance design and less costly system implementation
- Higher efficiency reducing total cost of ownership
- Higher temperature, longer life than plastic

Fibre Optic Transmitter – OPF372 Family

OPF372 Series fibre optic transmitter is specifically designed to efficiently launch optical power into fibres ranging in size from 50/125µm up to 200/300µm diameter fibre. This product's combination of features including high speed and efficient coupled power makes it an ideal transmitter for integration into all types of data communications equipment such as power generating stations and wind generator fields.

Features & Benefits

- Low cost 850nm LED technology
- Popular ST® style receptacle
- Pre-tested with fibre to assure performance
- Component pre-mounted and ready to use
- 35MHz operation

Resistors

MMA 0204, MMB 0207, SMM0204, SMM0207 Resistors

Professional and precision MELF resistors

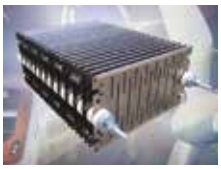
Features & Benefits

- Advanced thin film technology
- Superior stability: down to class 0.05
- Single pulse capability up to 3kV or 1kW for 0207
- Approved according to DIN EN 140401-803
- Compliant to RoHS Directive 2011/65/EU

Applications

- Power supplies
- Control units
- Signal conditioning

VSGR Power Resistors Stainless Steel Power Resistor



Features & Benefits

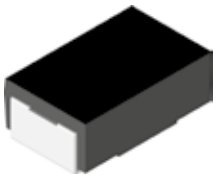
- High power capability up to 20kW at 40˚C
- Operating temperature range: 25˚C – +250˚C
- Protection IP00 to IP23
- Excellent price/performance ratio
- Easy to mount, heat-resistant, robust design, high resilience

Applications

- Windmills
- Turbines
- Railway equipment
- Diesel generators

Surface-Mount, Axial-Leaded and Vertical-Mounted Wirewound Resistors

High power (up to 1000W) to size ratio



Features & Benefits

- WSC/WSN – moulded case sizes 2012 – 6927, P_{70} (up to 3W), resistance range 0.1Ω – 8kΩ
- WSZ – SMD high-power (P_{25} up to 3.75W), silicone or cement coated, values up to 15kΩ
- CP/AC/G200/Z300 – axial-leaded, fireproof ceramic case, P_{40} up to 25W, values up to 45kΩ
- CPCx – vertical mount, fireproof ceramic case resistors. P_{70} up to 10W, resistance up to 150kΩ
- GWS/GBS/ZWS/ZBS/HL/NHL – tubular resistors up to 1000W, values up to 645kΩ

Applications

- Power supplies
- Line filtering

VSGR Power Resistors Stainless Steel Power Resistor

Features & Benefits

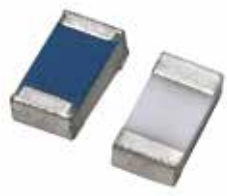
- Power rating up to 500W
- High overload capability
- Protection IP20 or IP65
- Aluminium housed construction
- Multiple construction possible for higher power ratings
- Heatsink mounting
- UL 600V/1000V

Applications

- Braking resistor
- Chopper resistor
- Load resistor
- Pre-discharging resistor
- Voltage limiting resistor

MC AT Series Resistors

Professional and Precision thin film chip resistors



Features & Benefits

- Operating temperature up to 175˚C
- High power rating up to P_{85} = 400mW
- Excellent humidity resistance
- New construction ensures extreme stability and reliability
- Precision tolerance: 0.1%

Applications

- Power supplies
- Control units
- Signal conditioning

Low-Profile, High-Current IHLP® Inductors

Features & Benefits

- Shielded construction
- Handles high transient current spikes without saturation
- Ultra-low buzz noise due to composite construction
- AEC-Q200 qualification available
- Temperature range up to 155˚C

Applications

- Low profile, high current power supplies

Capacitors

MKP386M/MMKP386 High-Pulse-Load Industrial Snubber Capacitors

Single (MKP) or double (MMKP) Metallized polypropylene film

Features & Benefits

- Tab terminal for direct IGBT mount
- Reduces or eliminates voltage or current spikes
- Limits dV/dt or di/dt
- Keeps loads in safe operating area (SOA)
- Reduces EMI by clamping voltage and current ringing
- V_{DC} to 2500; capacitance range of 0.047µF – 5.0µF

Applications

- Direct mount on IGBT modules
- Power, photovoltaic and wind inverters
- Frequency converters
- Motor drives – i.e. pumps

Safety Certified Capacitors

Surface Mount Multilayer Ceramic Chip Capacitors for Safety Certified Applications

Features & Benefits

- Approved IEC 60384-14:2005, 3rd edition
- Specialty: Safety certified capacitors
- Wet build process
- Reliable Noble Metal Electrode (NME) system

Applications

- Power supply boards
- EMI and AC line filtering
- Energy storage and distribution

MKP1848C Film Capacitors

Film capacitors with slim design

Features & Benefits

- High density DC-link capacitor (more C per vol)
- Halogen free product
- High peak and ripple current capability
- Low ESR, low ESL
- Life time expectancy > 100,000h (at U_{NDC} and 70˚C)

Applications

- Renewable energy – i.e. photovoltaic, wind, waves
- Power supply – i.e. UPS, battery charger
- Motor drives – i.e. pumps, forklifts

715C…KT/715C…DK "Hockey Puck"

High voltage ceramic disc DC capacitors

Features & Benefits

- Outstanding dielectric strength and high insulation resistance
- Voltage rating up to 50kV$_{DC}$/17 kV$_{RMS}$ (up to 60Hz)
- Maximum capacitance value $C_{max.}$ = 10nF
- Available in class 1 and class 2 ceramics
- High reliability and mechanical robustness
- Screw terminal mounting

Applications

- High-voltage power supplies
- CO_2 lasers
- X-ray equipment
- Welding equipment
- Medical accelerator equipment
- EMI filtering in wind turbines
- Spark-quenching capacitor

Snap-In Aluminium Electrolytic Capacitors 095/096 PLL-4TSI (Long Life at +85˚C) 159 PUL-SI (Long Life at +105˚C)

Long life: up to 10,000h at 85˚C and 5,000h at 105˚C

Features & Benefits

- Up to 500V rated voltage at high temperature
- 4-pins for excellent mounting stability
- Rated capacitance up to 2700µF
- Custom design available on request

Applications

- Industrial systems
- Smoothing and filtering applications
- Solar PV inverters
- Standard and switched mode power supplies

HE3/DSCC 10011 High-Energy Capacitors

Wet tantalum with low ESR range of 0.035Ω

Features & Benefits

- Capacitance range: 1100µF – 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

MOSFETs

E Series High-Voltage Power MOSFETs

Next-Generation 600V and 650V Super Junction MOSFETs

Features & Benefits

- Increased current density over S Series with a 30% reduction in specific on-resistance for reduced conduction losses
- Improved gate charge and low figure of merit (FOM) lower switching losses
- E_{AS} rated and 100% avalanche tested
- Variety of packaging options including TO-220, TO-220 FullPAK, TO-247AC/AD, D2PAK, DPAK and IPAK

Applications

- Telecommunications
- Computer and consumer
- Lighting
- Industrial
- Renewable energy

SiR880DP and SiR804DP Power MOSFETs

80V and 100V N-channel MOSFETs in PowerPAK® SO-8 package

Features & Benefits

- TrenchFET® technology
- Low $R_{DS(on)}$: 0.0059/0.0072Ω at V_{GS} = 10V
- Continuous drain current (I_D): 60A

Applications

- Motor controls and drives
- DC/DC converters

Diodes

GT100 Series (600V and 1200V), GB50 to GB90 Series (600V and 1200V) IGBT Modules

IGBT diodes in isolated SOT227 package

Features & Benefits

- Trench and NPT IGBT technology PTC for easy paralleling
- HEXFRED® and FRED Pt® as anti-parallel diode
- Very low internal stray inductance (< 5nH typical)
- Switching frequency from 8kHz – 100kHz; very low Vceon (down to 1.69V typ.)
- Industry standard package, 100% Pb free, UL-approved

Applications

- Primary inverter for HF welder
- UPS
- Large SMPS and induction heating

FRED Pt® Ultrafast Rectifiers 2x30A, 200V through 600V in TO247 Package

Low recovery current minimises switching losses

Features & Benefits

- Optimised trade-off between recovery time and forward voltage drop
- Low leakage current, down to 0.02µA (at 25˚C)
- 175˚C operating junction temperature
- Fully leaded Pb-free and RoHS-compliant devices
- Industrial level qualified

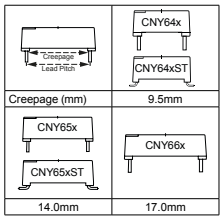
Applications

- Output rectification: HF welding/SMPS
- Telecom
- DC/DC converters and f/w diodes for low-voltage motor drives

Optoelectronics

CNY6x High Voltage Isolation Series

CAT IV High Voltage Isolation



Features & Benefits

- Category IV (CAT IV) isolation for basic and reinforced installations
  – Creepage from 9.5mm – 17.0mm
  – Recurring peak voltage, V_{IORM}, of 1450V_{PEAK}
  – Transient overvoltage, V_{IOTM}, of 12000V_{PEAK}
- Isolation voltage, V_{ISO}, of 8200V_{RMS}
- Distance from emitter to detector through insulation ≥ 3 mm

Applications

- Solar power and wind turbine diagnostic, monitoring and communication equipment
- Welding equipment
- High-voltage motors

VO3120 IGBT and MOSFET Drivers

Optocoupler in DIP-8 package with optical isolation

Features & Benefits

- 2.5A output current
- Wide operating voltage: 15V – 32V
- Low 2.5mA supply current
- 25kV/µs minimum CMTI
- 200ns maximum PWD

Applications

- DC brushless and AC motor drives
- Inverters and DC/DC converters
- Uninterruptible power supplies (UPS)
- Switch mode power supplies (SMPS)
- Welding equipment
- Induction stove tops
- Plasma displays

Power supply applications generally involve power adaptors, desktop power, or server power. Power supplies require passive components which are highly stable when exposed to temperature fluctuations, and boast very low ESR (equivalent series resistance) values and high ripple current ratings. The series' high capacitance values and low ESR enable low impedance at high frequency to support excellent noise suppression and ripple absorption in a wide array of applications in which space is critical and cost per placement and maximum throughput are priorities.

Recommended Products

High Capacitance (≥1μF) MLCC – CC Series

Features & Benefits
- Materials: X5R, X7R and Y5V
- EIA case size: 0201 – 1812
- Capacitance: 1μF - 100μF
- Rated working voltage from 6.3V – 50V

Applications
- Inverters
- UPS
- Computing servers

Sulphur Resistant Chip Resistors – AF Series

Features & Benefits
- Excellent sulphur resistant capabilities
- Anti-FOS test: ASTM-B-809-95
- Moisture resistance to MIL-STD-202 method 106
- Load life stability: 1,000 hours at 125˚C

Applications
- Communication base stations
- Computing servers
- Mining

High Voltage MLCC – CC (≥100V) and SC Series (≥ 1KV)

Features & Benefits
- Materials: NP0 and X7R
- Common High Voltage Series:
- Size: 1206 – 1812
- Voltage: 100V – 3kV
- Safety Certification Series:
- TUV certification for 1808 and 1812 size (X1/Y2 and X2/Y3)
- UL certification for 1808 and 1812 size (X1/Y2)

Applications
- Power supplies
- Lighting ballast
- Medical devices

High Voltage Resistors – RV Series

Features & Benefits
- Higher maximum working voltage (MWV)
- Compatible with lead containing and lead free soldering process
- Highly stable in auto-placement surface mounting
- Reliable multilayer electrode construction

Applications
- Battery charger
- Power supplies
- Alternative energy

Soft-Termination MLCC – CS Series

Features & Benefits
- Material: X7R
- Capacitance: 100pF – 1000nF
- Rated working voltage: 6.3V – 630V
- Flexible termination system
- Improved resistance to thermal stresses
- Increased mechanical performance

Applications
- Switching power supplies
- High flexure stress circuit boards
- Power and battery lines

Metal Glazed Resistors – HHV Series

Features & Benefits
- Excellent pulse loading capability
- Higher working voltage, high power rating
- Resistance to high temperature/humidity
- Highly stable and reliable
- Flameproof multilayer coating (UL94V-0)

Applications
- Power supplies
- Home appliance
- Pulse protection

Snap-in Electrolytic Capacitors – LC Series

Features & Benefits
- Longer life (105˚C, 5,000 hours)
- Snap-in terminal, high ripple current
- Stable ESR
- Rated working voltage range: 160Vdc – 450Vdc
- Rated capacitance range: 270μF~2,200μF

Applications
- SMPS
- Adapter
- Smoothing and filtering

Low TCR Current Sensing Resistors – PE, PA Series

Features & Benefits
- Excellent TCR
- Precision current sensing control
- Ultra low ohmic down to 0.0005Ω
- Metal technology

Applications
- DC-DC converters
- SMPS
- Industrial control

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