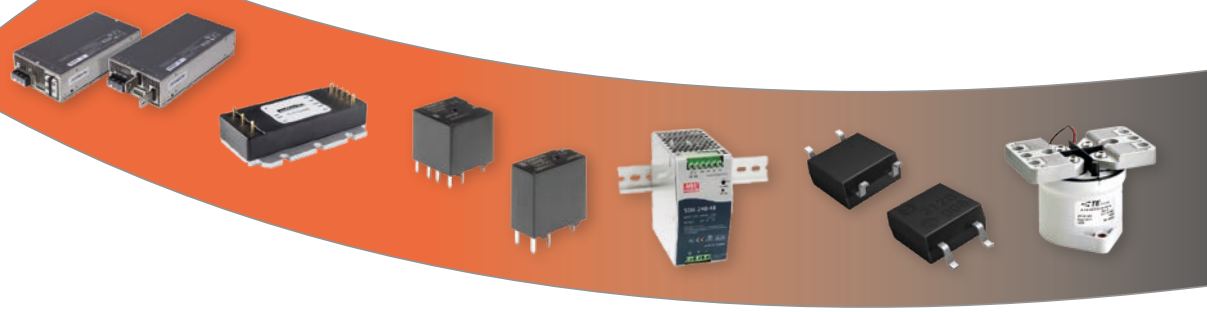


ttieurope.com

Relay & Power Application Guide

TTI, Inc., – A Berkshire Hathaway Company

ttieurope.com

The Specialist in Electronics Component Distribution

Founded in 1971, TTI has steadily grown to become a world leading specialist distributor of electronic components. The company was founded on the premise that passive component purchasing could be made more efficient by offering product specialization, customer-driven service and proprietary supply chain solutions.

One of the largest Autostore systems in Europe

Why TTI?

- **Technical Experts** TTI's European team of field-based Sales Engineers and local Product and Technical Specialists are here to support you; from understanding component trends, sustainable sourceability and new product roadmaps, to in depth technical support for your design from our technical engineering experts.
- **Value Added Services** Connector assembly is one of the most important value-added services at TTI, Inc. – Europe. We are specialized in distributing manufacturer controlled and certified connectors and interconnect solutions from globally leading suppliers. Thanks to a large inventory level of connector components, TTI, Inc. – Europe can serve any market requirements.
- **Global Distribution Centers** Our European headquarters is located just outside of Munich, Germany in Maisach-Gernlinden. In total, we have 45.000m^2 of dedicated warehouse space and local sales and technical support in over 40 locations across Europe. TTI has more than 195.000m^2 of automated warehousing in North America, Europe and Asia. All are linked into a global warehouse management system that provides superior customer service and overall business efficiencies. Wherever you are in the world, TTI can support you. Year after year, customers rate our inventory availability, on-time delivery and accuracy among the very best in the industry – contact us today to find out what a true specialist has to offer.
- **Quality and Reliability** TTI is the first distributor to have all global warehouse locations ISO registered and certified to ISO 9001 and ISO 14001 Standards. TTI Europe is also certified to EN9120/EN9100, IECQ-CECC and ISO/IEC 27001 Standards. Additionally, all of our European sales branches are ISO 9001 certified. TTI has one global documentation system that ensures that every TTI branch and warehouse in the world follows the same processes.

Local Sales and Technical Support in over 40 locations across EMEA

Global Distribution Centres

195.000m²

of automated warehousing in North America, Europe and Asia

European HQ, Munich

45.000m²

of dedicated warehouse space

ttieurope.com

Finding the Right Product Solution for your Design

TTI has a wealth of Relay design expertise and offers a wide range of relays from safety critical relays, automotive specified relays, solid state relays, MOSFET relays, signal relays and power relays. We have a wide range of high voltage contactors for battery management systems for electric cars, trucks, buses and DC charging stations and energy storage systems.

Finding the right power solution for your design requirements from front-end, low, mid, high power AC/DC converters to DC/DC standardised bricks, converters, POLs, plug-in external power supplies, adaptors, Industrial DIN-rail and intelligent configurable power supplies; TTI has a world-class range of power supplies to offer.

TTI's specialised power engineers welcome the opportunity to work with you to help develop power solutions and resolve your issues like EMI, heat dissipation, medical/rail regulations and certifications.

ABB
Advanced Energy
cynergy3
flex authorized partner
Littelfuse
MEAN WELL
molex
muRata INNOVATOR IN ELECTRONICS
OMRON
Panasonic INDUSTRY
Sensata Technologies
Standex Electronics
TDK
TE connectivity AUTHORIZED DISTRIBUTOR
TELEDYNE RELAYS Everywhereyoulook™

Relay & Power Line Card

Relays & Circuit Breakers

	IDEC	KEMET	Littelfuse – Ixys	Omron	Panasonic	Phoenix Contact	Radiall	Standex Meder	Sensata – Crydom , Cynergy 3	TDK Electronics	TE Connectivity – Kilovac, CII, Kissling	Teledyne	Toshiba	Vishay
Relays														
Automotive			◆	◆	◆			◆			◆			
Communication		◆	◆	◆	◆			◆			◆	◆		
Contactors/ Electrification				◆	◆					◆	◆			
Control	◆			◆	◆						◆	◆		
Counters				◆										
Crystal Can (Military)											◆	◆		
Definite Purpose Contactors				◆	◆						◆			
DIN Rail Mounted	◆			◆	◆	◆			◆		◆	◆		
Force Guided Contact	◆			◆	◆						◆			
General Purpose	◆			◆	◆						◆			
High Frequency Relays				◆	◆		◆	◆			◆	◆		
High Voltage			◆	◆	◆			◆	◆		◆	◆		
Industrial DC & AC	◆			◆	◆						◆	◆		
Input/Output Modules				◆	◆						◆			
Magnetic Latching				◆	◆						◆	◆		
Microwave				◆	◆			◆			◆	◆		
Military/Space											◆	◆		
Miniature PCB		◆		◆	◆				◆		◆	◆		
MOSFET/PhotoMOSTM			◆	◆	◆							◆	◆	◆
Panel/Plug-In	◆			◆	◆	◆			◆		◆	◆		
Power	◆		◆	◆	◆						◆	◆		
Reed			◆					◆	◆		◆	◆		
Safety	◆			◆	◆						◆			
Signal		◆	◆	◆	◆			◆			◆	◆		
Sockets	◆			◆	◆						◆			
Solid State Relays	◆		◆	◆	◆	◆			◆		◆	◆		
Time Relays	◆		◆	◆		◆					◆			
Circuit Breakers														
Magnetic Circuit Breakers						◆					◆			
Thermal Circuit Breakers						◆					◆			

Power Supplies

	Advanced Energy (Artesyn, Excelsys, SL Power)	Flex Power Modules	ABB, Embedded Power	MEAN WELL	Murata Power Solutions	TDK	TT Electronics, Power Partners	Vishay
Internal/Embedded – AC/DC								
Low to Mid Power (1W – 500W)	◆		◆	◆	◆		◆	
High Power (500 – 1.5KW)	◆		◆	◆	◆		◆	
Single Output	◆		◆	◆	◆		◆	
Multi-Output (Dual, Triple, Quad)	◆			◆			◆	
PCB Mount				◆	◆		◆	
Open Frame	◆		◆	◆	◆		◆	
U-Channel/Enclosed	◆		◆	◆			◆	
Modular/Configurable	◆			◆			◆	
ATX				◆				
Front End, Bulk Power	◆		◆	◆	◆			
Medical Rated	◆			◆	◆		◆	
Conduction Cooled	◆		◆				◆	
Industrial Temperature	◆		◆	◆	◆		◆	
Extended Temperature	◆			◆	◆		◆	
I2C PMBus Control/Interface	◆		◆	◆	◆			
Power Over Ethernet (PoE)			◆				◆	
External – AC/DC								
Wall Mount Adapters	◆			◆			◆	
Desktop	◆			◆			◆	
Medical Rated	◆			◆			◆	
DIN Rail	◆			◆				
High Power (1KW – 24KW)	◆		◆	◆	◆			
LED Drivers				◆				
KNX products				◆				
Laboratory Power Supplies Programmable	◆							
Specific Purpose								
UPS				◆			◆	
Battery Charging				◆			◆	
Inverter (DC/AC)				◆				
Security				◆				
DC/DC								
Isolated DC/DC Converters								
Fractional Brick	◆	◆	◆	◆	◆			
Digital Control	◆	◆	◆		◆			
Industrial Pin-Out	◆	◆	◆	◆	◆			
Intermediate Bus Converter	◆	◆	◆		◆			
Low Power Unregulated		◆		◆	◆			
Wide Input Range 4:1	◆	◆	◆	◆	◆			
Surface Mount	◆	◆	◆	◆	◆			
DC/DC Railway	◆	◆		◆	◆			
DC/DC Filters and Filter Modules			◆					
Non Isolated POL Converters								
Digital Control	◆	◆	◆					
Through Hole	◆	◆	◆	◆	◆			
Single In Line		◆	◆	◆	◆			
Surface Mount	◆	◆	◆		◆	◆		◆
Ancillary Power Products								
ATCA PIM Modules		◆	◆					
RF/Power Amplifier	◆	◆	◆					
PFC Modules	◆							
300Vin Modules	◆							
Embedded DC/DC								
Open Frame/Enclosed				◆				
Front End Bulk Power	◆		◆		◆			

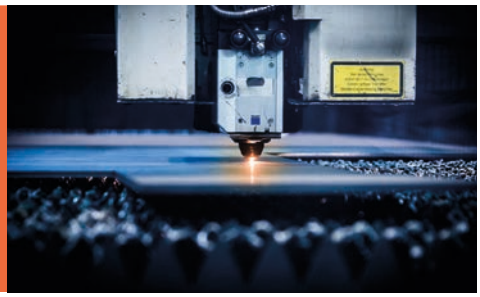
Power Supply Accessories

	Kemet /Yageo	Schaffner	Schurter	TDK	TE – Corcom	3M	EBM PAPST	Laird
Power Line EMI/RFI Filters								
Single-Phase Filters	◆	◆	◆	◆	◆			
3-Phase Filters	◆	◆	◆	◆	◆			
3-Phase Filters	◆	◆	◆	◆	◆			
Thermal Management								
DC Fans							◆	
AC Fans							◆	
Heatsinks								
Thermal Materials						◆		◆
Thermal Adhesive/Compounds						◆		◆

ABB

Rectifier CP3500AC65TEZ

Modern factory processes benefit from this high efficient/high density power solution. Its wide programmable output voltage makes it versatile. RS485 and I2C communication buses effortlessly connect to a wide range of standard applications.



Applications

- Lasers
- RF power amplifiers
- Industrial battery chargers

CP3500AC65TEZ

Features & Benefits

- Compact 1RU form factor with 40 W/in3
- Efficiency exceeding 96% (meets 80+ Titanium)
- Programmable output 23–65VDC
- Redundant +5V at 2A Aux power
- Redundant, parallel operation with active load sharing
- Incorporates RS485 and I2C communications busses

Non-isolated point of load converters

Demanding process control circuits benefit from these POL converters. Industrial input ranges, rugged specifications and DOSA make them ideal for ease of design. Design cycles are shortened by selecting these standard off-the-shelf parts with proven track records.

Applications

- Electronic control circuits
- FPGA designs
- Communication circuits

DLynx

Features & Benefits

- Advanced thermal management gives high efficiency (96%)
- Wide input (3–14.4Vdc) and wide output range (0.45–5.5Vdc)
- Both digital and analog versions

ProLynx

Features & Benefits

- Three products available, 3A, 5A and 12A
- Ultra wide input voltage range of 9–36Vdc
- Extended output voltage range 3–18Vdc
- High efficiency operation up to 97%
- Possible to create negative output from a positive input
- Extended shock and vibration

LITTELFUSE/IXYS

Semiconductor relays for industrial applications

The combination of low on-resistance and high load current handling capabilities makes the IXYS MOSFET relays suitable for a variety of high-performance switching Industrial applications. Switching of these relays is controlled via a highly efficient GaAlAs LED on the input side which provides the light that is converted into electrical energy by a photovoltaic generator/driver on the isolated output side.

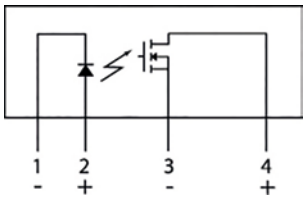
Applications

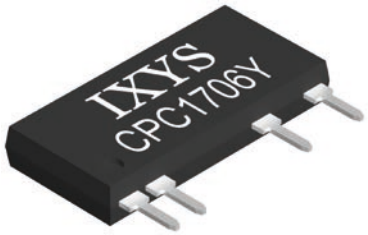
- Industrial controls
- Motor control
- HVAC control
- Robotics
- Multiplexers
- Electronic switching
- Starter ignition circuits
- Rail applications

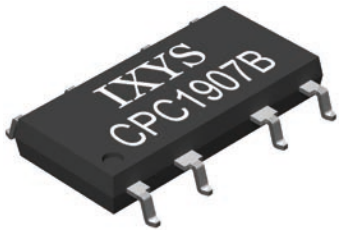
CPC1706 ($60V_{DC}$, $4A_{DC}$)

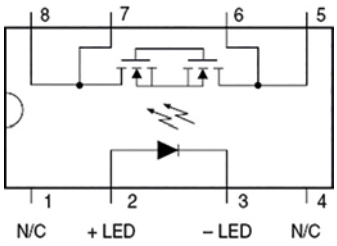
Features & Benefits

- 1-pole: 1 NO output
- Load currents up to 4ADC at 60VDC
- Power SIP package
- Fulfils low drive power requirements
- 2500VRMS isolation, input to output









CPC1907B (60V AC peak or DC, 6A)

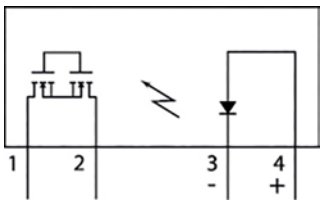
Features & Benefits

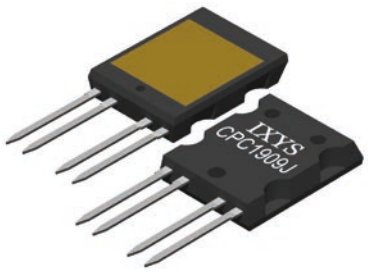
- 1-pole: 1 NO output
- Load currents up to ±6ADC or 6ARMS at 60VP
- 5000VRMS input/output isolation
- Arc-free with no snubbing circuits
- No EMI/RFI generation

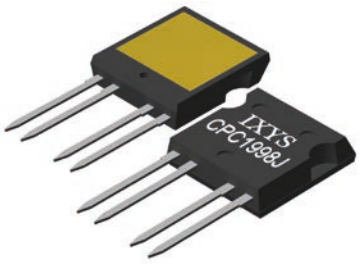
CPC1909 (60V AC peak or DC, 15A)

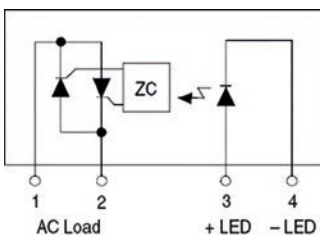
Features & Benefits

- 1-pole: 1 NO output
- Load currents up to 6.5ADC or 6.5ARMS (Free Air)
- Load currents up to 15ADC or 15ARMS (5K/W heatsink)
- Low 0.1Ω on-Resistance
- 2500VRMS input/output isolation
- Flammability rating UL 94V-0









CPC1998 (20–240VAC, 20ARMS)

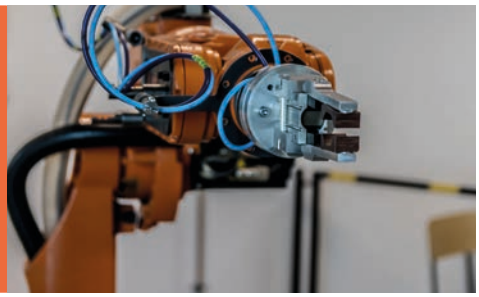
Features & Benefits

- 1-pole: 1 NO output
- Load currents up to 5ARMS (free air)
- Load currents up to 20ARMS (5K/W heatsink)
- 800VP blocking voltage
- 5mA control current
- 2500VRMS isolation, input to output

MEAN WELL

Industrial Power Rack

Modern factory processes benefit from this high efficient/high density power solution. Its wide programmable output voltage makes it versatile. PMBus® (I2C) or CANBus® communication buses effortlessly connect to a wide range of standard applications. Active current sharing supports layout for fail safe operation of equipment in critical processes.



Applications

- Charging applications in harsh environment
- Laser cutting
- Electrolysis system
- Telecommunication
- Robotic

DPU/DBU/DRP/DBR-3200

Features & Benefits

- Full range AC input 90-264Vac
- Output: 24V/48V
- Fully digital control
- High efficiency up to 94.5%
- Built-in OR-ing MOSFET and hot-swap capability (DRP/DRB Rack Systems)
- PV and PC functions
- Active current sharing, parallel up to 5 units for 16kW system (25600W for 2 x DRP racks)
- Built-in charging curve options for different batteries (DBU/DRB-3200)
- Built-in I2C/PMBus® communication protocol (CANBus® optional)
- Protections: Short/OLP/OVP/OTP
- 5 year warranty

Panasonic

Panasonic INDUSTRY

Safety relays: miniaturization of designs

Panasonic Industry offers safety relays for a variety of applications such as factory & industrial automation, machine tool, robots, safety PLCs and more. Especially with SFM, SF-Y and SFS series, Panasonic Industry serves the demand for safety relays suiting modern slim and miniaturized application designs.

Applications

- Safety Relay modules
- Safety controller/PLCs
- Safe motion control
- Access control
- Elevator control
- Escalator control
- AGV (automated guided vehicle)
- Emergency stop

SFM

The 6A SFM – the world's flattest 2-pole relay with forced guided contacts – comes with an unrivaled height of 7.8mm and can directly control loads without using a separate relay in a wide range of applications. Unique is the reflow soldering capability of SFM series, that makes production as easy as it has never been before.

Features & Benefits

- 1 NO/1 NC relay with forcibly guided contacts according to EN 61810-3
- Extremely low height of 7.8mm
- Rating 6A (NO), 4A (NC) at 250VAC and 30VDC
- 100mW coil holding power
- High shock resistance >20g
- THT and THR type available
- Reinforced insulation ≥ 5.5mm (V=230V overvoltage category III, 6KV) on NO side

SFY

The 4- and 6-pole SFY relays deliver low power consumption and high switching capacity, requiring only up to 40% less space compared to alternative relays. The strong silver alloy contacts can handle 6A at the same time on every switching path – without derating even for the 5a1b type.

Features & Benefits

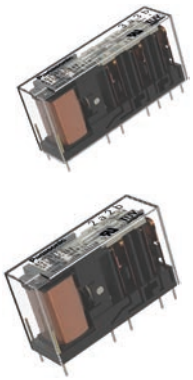
- Forcibly guided contacts according to EN 61810-3, Type A
- 4-pole version: 2 NO/2 NC or 3 NO and 1 NC contacts
- 6-pole version: 4 NO/2 NC or 5 NO and 1 NC contacts
- Low profile design, 14.5mm high
- Very low coil power dissipation
- High shock and vibration resistance
- Degree of protection RTIII
- Suitable for applications requiring IEC/EN 60335-1
- Reinforced insulation

SFS

Designed in a slim PCB space-saving way, the 4- and 6-pole SFS relays stands out with very low dissipation power and high switching current – and delivers the option of an integrated status LED for industrial purposes.

Features & Benefits

- Forcibly guided contacts according to EN 61810-3, Type A
- 4-pole version: 2 NO/2 NC or 3 NO and 1 NC contacts
- 6-pole version: 4 NO/2 NC, 5 NO and 1 NC or 3 NC and 3 NO contacts
- Optional LED & integrated freewheeling diode
- Sockets for PC boards or DIN-rail mounting available
- VDE approval according to DIN EN 60947-5-1 available

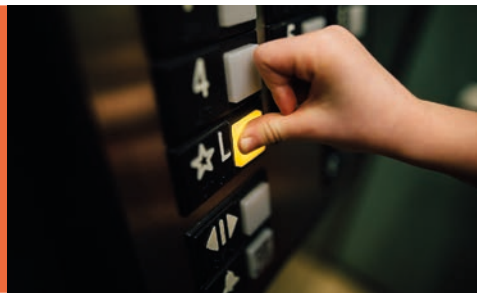


TE Connectivity's SCHRACK Relays

AUTHORIZED DISTRIBUTOR

Industrial safety power relays (6/8A)

TE's SCHRACK range of forcibly guided relays safeguard devices by providing stopping and starting safety executions, with minimal effort. Safety relays constantly examine and verify the safety of machinery and provide high performance, reliability and are certified according to EN50205 regulations.



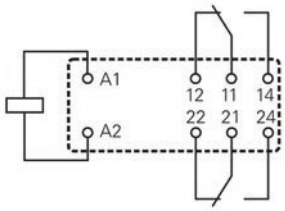
Applications

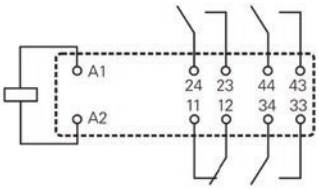
- Emergency shut-off/stop
- Press control
- Machine control
- Process technology
- Elevator control
- Escalator control
- Safety modules & doors
- Rail applications

SR2M

Features & Benefits

- 2-pole: 1 NO + 1 NC and 2 CO contacts
- 6A at 250VAC
- Reinforced insulation between poles 1.500VA
- According to EN50205





SR4D/M

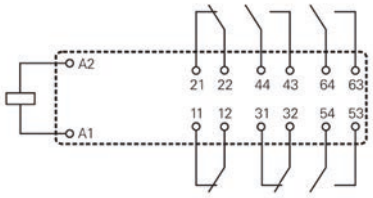
Features & Benefits

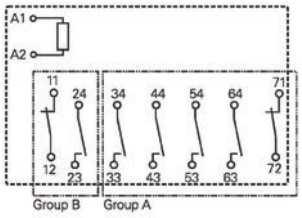
- 4-pole: 2 NO + 2 NC and 3 NO + 1 NC contacts
- 8A at 250VAC
- Compact design, space efficient
- Reinforced insulation between all contacts 2.000VA
- According to EN50205

SR6 A/B/C/V

Features & Benefits

- 4-pole: 3 NO + 1 NC and 2 NO + 2 NC contacts
- 6-pole: 3 NO + 3 NC/4 NO + 2 NC/5 NO + 1NC
- 8A at 250VAC
- Reinforced insulation between all contacts depending on version 2.000VA
- According to EN50205





SRL7

Features & Benefits

- 7-pole: 2 NC + 5 NO contacts
- 6A at 250VAC
- 1.500VA
- Coil power: 700mW
- According to EN50205

TE Connectivity's SCHRACK Relays

AUTHORIZED DISTRIBUTOR

Industrial power & panel plug-in relays (1-32A)

Virtually every control panel installed in an industrial application will require industrial relays. Complying with standardized PCB footprints, TE offers a wide range of inrush current capabilities, coil and termination options that address the complete spectrum of requirements for factory automation & control panels.

Applications

- Production lines
- Robotics
- Elevators
- Control panels
- CNC machines
- Interface technology

PT (2/3/4 Pole)

Features & Benefits

- 1/2/5/6/10/12A and 2/3/4 form C (CO) contact
- Sensitive coil 750-900mW
- Manual test tab, optionally lockable
- Mechanical indicator
- Optional LED, protection diode

XT (1/2 Pole)

Features & Benefits

- 8/16A and 1/2 form C (CO) contact
- 4kV/8mm dielectric strength between coil and contact
- Reinforced insulation
- Mechanical and electrical indicator

MT (2/3 Pole)

Features & Benefits

- 4/10A and 2/3 form C (CO) contact
- DC and AC coils
- Mechanical indicator, indicator lamp and push-to-test options
- Industry standard octal/undecal type termination

RM2/3/7/8/C/D (1/2/3 Pole)

Features & Benefits

- 10/16/25/30/32A and 1/2/3 form C (CO) + 1Z (NO+NC) + 1X (NO) contact
- Power relay with push-on and solder terminals
- Various mounting options
- Indicator lamps and mechanical indicator
- Optional push to test button

TE Connectivity's SCHRACK Relays

AUTHORIZED DISTRIBUTOR

T92H Series Two-pole Power Relay

TE Connectivity (TE)'s Potter & Brumfield T92 series two-pole, 50A relay benefits from improved materials and design to achieve high power and temperature ratings for use in demanding industrial, power, and lighting applications.

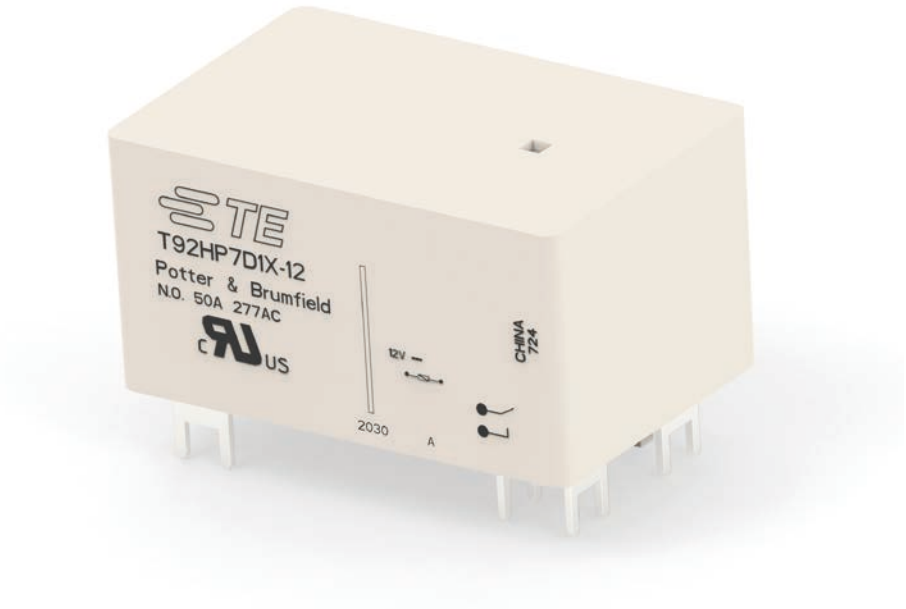
Applications

- HVAC
- Residential
- Commercial appliances
- Industrial Controls
- EV Charging

The improved conductivity and heat-dissipation capability of the T92 relay results in improved ratings: the T92H type is rated for a maximum current of 50A, and a 277V AC voltage.

Features & Benefits

- 45A/50A switching capability
- Meets requirements of UL 508 and UL 873 spacings – 8mm through air, 9.5mm over surface
- Meets requirements of 8mm spacing, 4kV dielectric coil-to-contact
- Meets requirements of UL Class F construction



Teledyne Relays

TELEDYNE RELAYS Everywhereyoulook™

Series SQ

Quad Output 25A, 280 Vac DC Solid-State Relay

Features & Benefits

- Four independently controlled solid-state relays in an industry standard package.
- Tight zero-cross window for low EMI
- Constant current input for low current draw
- Faston terminals
- High-power switching
- Optical isolation ensures complete protection of the control circuit from load transients
- Heating & motor control, industrial & process controls, on/off control of AC equipment
- UL recognized (UL File Number: E128555)

Part Number	Description
SQ24D25	25A, 240 Vac Solid-State Relay

Part Number Explanation

SQ	24	D	25
Series	Line Voltage[1]	Switch Type[2]	Output Current – Amps

Electrical specifications

(+25°C ambient temperature unless otherwise specified)

Input (control) specifications		Min	Max	Units
Control Range	SQ24D25	3	32	Vdc
	SQ24R25	4	40	Vdc
Input Current Range	See Figure 2			
Typical Turn-On Voltage		4.3		Vdc
Must Turn-Off Voltage			1	Vdc
Reverse Voltage			32	Vdc

Figure 1: Mechanical specification

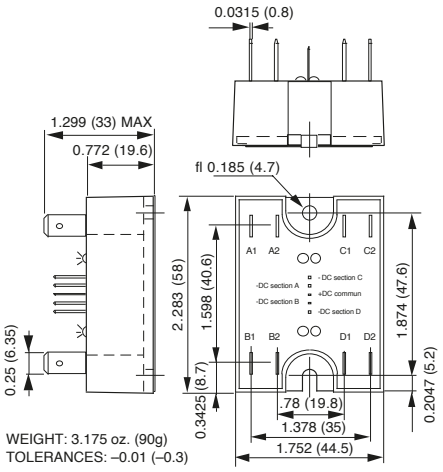


Figure 2: Control characteristic

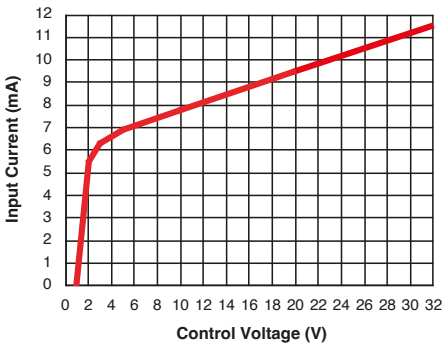
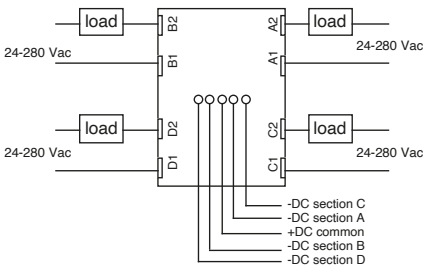


Figure 3: Typical application



[1]Line Voltage (nominal): 24 = 240 Vac
[2]Switch Type: D = Zero-cross turn-on; R = Random turn-on
[3]Control LED model available. Contact factory.

Advanced Energy

Conduction Cooled enclosed PSU

Industrial thermal management shows a growing demand for fanless power supplies that provide high usable power at elevated temperatures with some environmental protection. The absence of unwanted airflow minimizes the circulation of controlled particles, contaminants and microbes

Applications

- Industrial heaters
- HVAC systems
- Large industrial coolers
- Thermal management in the food industry
- Compressors and motor drives for thermal management

LCC Series

Features & Benefits

- 250W and 600W available higher power models in development will be launched in 2021
- No temperature derating over wide temperature range -40°C to 85°C baseplate
- Adjustable output
- IP65 version
- I2C/PMBus®
- Remote On/Off; AC_OK; DC_OK
- Active current share
- ITE and medical safety

OMRON

PCB power relays G2RL/G5RL

Heating, ventilation and air conditioning is the technology of indoor and vehicular environmental comfort. It's goal is to provide thermal comfort and acceptable indoor air quality.

Applications

- HVACR
- Building automation (shutter, lighting)
- Boilers/heaters
- Home appliance: white goods

Both the G2RL and G5RL relay family are low profile PCB power relays with 15.7mm height which makes them ideal for use in HVAC applications.

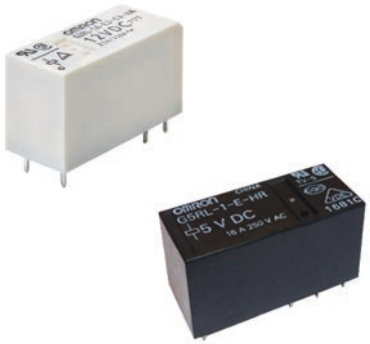
Features and Benefits

G2RL-RELAY

- Conforms to VDE (EN61810-1), UL508 and CSA22.2
- IEC/EN 60335-1 conformed (HA model)
- Ambient operating temperature of 85°C and 105°C (CV model)
- Coil insulation system: Class F (UL1446)

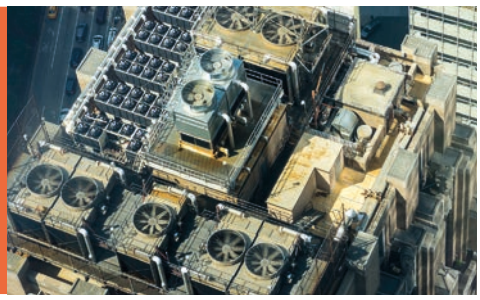
G5RL-RELAY

- 10kV Impulse withstand voltage
- Models with AC or latching coil available
- High-inrush model available (Inrush peak 100A)
- Low Noise and TV8 models available



Miniature Power Relay G5NB/G5Q (EL/EL2/EL3)

Now with OMRON G5NB and G5Q slim power relays, small PCB designs for HVAC can be easier to create than ever. These relays have 40–60% smaller footprints compared to standard cube relays.



Applications

- FA I/O modules
- Output of control systems
- Small electric appliances
- Air conditioners

Features and Benefits

G5NB-RELAY

- Coil power consumption of only 200mW
- 10-kV impulse withstand voltage
- IEC/EN 60335-1 conformed (-HA model)
- IEC/EN 60079-15 conformed versions available

G5Q-RELAY

- IEC/EN 60335-1 conformed
- Switching IEC/EN 60079-15
- EL: 100,000 operations durability at 10A (250 VAC)
- EL2: 40A inrush current & UL508 TV3 conform
- EL3: 30A inrush current for motor switching

Advanced Energy

Lowering the cost of powering your horticultural lighting systems

Using a large centralized current source outside the environmentally controlled growth areas directly powering all the luminaires eliminates the need for individual drivers and the associated costs. High degree of control enables easier design of flexible light programs.

Applications

- Horticultural lighting
- Large industrial lighting systems
- Centralised powered lighting for large buildings/sites

iHP Series

Features & Benefits

- Outputs versatile CC or CV
- Output voltages up to 1kV
- Output currents up to 1600A
- 12kW or 24kW rack
- 4/8 slots
- 100% digital control
- Fully programmable lighting control allowing independent management of multiple areas with different schedules and light intensities

MEAN WELL

Enclosed and rainproof PSU for LED sign panel

Wide voltage ranges, form factor and mechanical construction of MEAN WELL's UHP and ERP series make it ideal for signage, industrial, and residential applications to be mounted under just a protecting roof. These power supplies provide reliable, affordable conversion for outdoor applications where only limited protection against the environment is available. Cooling by free air convection and wide temperature range support life long operation.

Applications

- LED strip lighting
- LED channel letters
- LED moving sign
- LED display
- Industrial automation machinery
- Household appliances
- Industrial control system
- Charging related equipment
- Test and measurement instrument
- Laser related machine

UHP Series

Features & Benefits

- Series: UHP-200/350/500(R)/750/1000/1500/2500
- Output voltage: 3.3,4.2,5,12,15,24,36,48
- Universal AC input: 90~264VAC
- Low profile: 26 to 41mm (H)
- Active PFC function
- 150% peak load capability (100ms)
- Fanless design (semi-potted)
- Optional "R" model: DC OK and redundancy functions
- Operating altitude up to 5000m
- Working temperature: -30~+70°C
- UL62368-1, TÜV EN62368, EN 60335-1
- 3 year warranty
- CANBus®/PMBus® optional for 1000W

ERP Series

Features & Benefits

- Design against rain splash
- Cooling by free air convection
- Withstand 300VAC surge for 5 seconds
- For outdoor use under roof
- 400W model for EU, 200W and 400W for ROW
- Wide AC input
- Low cost high reliability

MEAN WELL

XBG Series

Its circular shape makes this driver ideal for high bay lighting in warehouses and large halls but also for outdoor applications. The design features constant power mode operation minimizing stock keeping units

Applications

- LED bay lighting
- LED stage lighting
- LED spot lighting
- Explosion-proof lighting
- Type HL LED driver for class I division 2

XBG Series

Features & Benefits

- Full power output at 70–100% constant current range operation
- Wide input range 90–305VAC with active PFC function
- Metal housing design with IP67
- Multiple dimming functions: 3 in 1 (0–10V/PWM/Resistor)
- Dimming circuit with Isolated for latest safety regulation
- Surge protection with 6KV/4KV
- Typical lifetime > 50000 hours and 5 year warranty
- AC input cable with connector for flexible installation

MEAN WELL

XLG Series

Features such as IP67-grade and good surge protection make this driver perfect for demanding outdoor environments. This series builds on MEAN WELL's proven track records as market leader adding constant power mode to the range. This constant power mode helps minimizing stock keeping units supporting users in efficiently and timely go to market

Applications

- Street lighting
- Signage
- Stage lighting
- Fishing lighting
- Horticulture lighting

XLG Series

Features & Benefits

- XLG:25/50/75/100/150/200/240
- Constant power and constant voltage versions
- Constant Power: L type(700~1050 mA) M type(1400~2100 mA) H type(250~6600 mA)
- Constant voltage: 12V,24V
- Wide input voltage range(100~305VAC), suitable for various lighting worldwide
- Low profile
- Surge protection: 6kV/4kV
- Optional: 10KV/6KV
- Metal enclosure IP67, suitable for outdoor & harsh environment
- 3-in-1 dimming (dim to off and isolation design)
- XLG-25/50 meets SELV
- High efficiency up to 93%
- 5 year warranty

Sensata/Crydom

Sensata Technologies • Crydom

Solid State Relays for Lighting Control Applications

The SSR utilizes a back-to-back SCR output which provides added reliability in commercial and heavy industrial applications. The SSR has a high surge current rating and is available with a zero voltage (resistive loads) or instantaneous turn-on (inductive or phase controlled loads) output. Therefore CX & 53TP Series are the ideal solution.

Applications

- Lighting
- Control of incandescent lamps
- Heating systems
- Control of electromagnets
- Motor controls
- Control of discharge lamps

CX Series (PCB Mount)

The CX Series SIP Solid State relay is ideally suited for high density PCB applications where a maximum of 5A of current is required. CX Series is available with a wide range of AC and DC outputs to suit most applications. All relays in this range are UL, CSA and TÜV rated.

Features & Benefits

- Standard SIP package
- Ratings of 5 A at 280 VAC
- Back-to-back SCR output for heavy industrial loads
- AC or DC control
- Zero voltage turn-on (resistive loads) output
- UL, CSA and TÜV certified, CE compliant to EN60950-1

53TP (Panel Mount)

Crydom panel mount solid state relays are designed to easily mount on flat panels or heat sinks with screws through the SSR's baseplate. Available in various industry standard sizes, the panel mount relay is currently the most used mounting type in the solid state relay market.

Features & Benefits

- Three-phase solid-state relay; ratings 25 A, 50 A per phase at 48–530 VAC
- 2 package styles IP00 or IP20 (See IP20 spec sheet)
- SCR output for heavy industrial loads
- Transient protection built in
- AC or DC control
- Zero-crossing (resistive loads) or random-fire (inductive loads) output
- LED input status indicator
- UL recognized, CE compliant to EN60950-1

Panasonic

Variety of polarized relays for efficient lighting control

For switching requirements in the field of IoT, home automation and lighting, Panasonic Industry offers a number of polarized relay innovations such as the DE or DJ-H series.

Applications

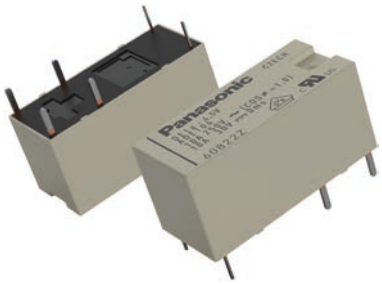
- Smart plugs/smart switch
- Smart lighting/lighting
- Security equipment
- KNX-Bus application
- Office automation
- Shutter/sunblind control
- Street lighting

DE

Being one of the smallest 16A polarized power relay in the market, DE series enable miniaturization in any application – and render the perfect choice for contemporary slim luminaire products. The polarized coil system and especially the latching versions helps to increase the power efficiency of your application: the DE relay consumes no power during on or off states, just during the short switching period.
To cover applications that cannot allow latching relays, the DE relay is available as a monostable version with very low power consumption to keep losses low.

Features & Benefits

- Small size 25x12.5x12.5mm
- 16A 250VAC, 10A 30VDC
- Nominal operating power 200mW
- Single side stable, latching 1 and 2 coils
- Constant & short set/reset/bounce time over whole lifetime
- Coil voltage from 1.5V up to 48V
- Separated contact chambers for 1a1b/2a versions
- UL/CSA , VDE approved



DJ-H

The DJ-H is a 50A polarized power relay with high inrush current, serving the purposes of many building automation features such as switching actuators for lighting and motor loads. DJ-H relays can switch 50A at 277VAC (resistive load) and are certified for fluorescent lamp loads according to IEC 60669-1 at 200µF/20A and 250VAC

Features & Benefits

- High inrush capability
- Tungsten load (TV-20 class)
- Electronic ballast load (NEMA410)
- Capacitive load (IEC 60669-1)
- Ambient temperature: -40 to +85°C
- Manual switch type available
- Sensitive coil: 1- coil latching: 1W; 2-coil latching: 2W
- Surge breakdown voltage between contact and coil: 12kV

Panasonic

Switching under harsh conditions

Panasonic Industry meets next generation requirements of securing safety levels within sophisticated industrial units by offering the 5mm slim PA-N type. The purpose of those power relays is, in essence, to reliably switch an ever increasing number of actuators – and a wide variety of load-behavior they may encounter.

Applications

- Output relays for programmable controllers
- Output relay for temperature controllers
- Interface relay
- Industrial equipment

ATEX-certified PA-N relay

ATEX-certified PA-N relay is conceived for harsh, hazardous or potentially explosive environments with currents up to 5A and can be operated in a temperature range up to 110°C.

Features & Benefits

- Small size 20 x 12,5 x 5mm
- 5A 250 VAC, 5A 30 VDC
- High reliable bifurcated contacts
- Minimal switching load 1mA 5VDC
- Nominal operating power of 110mW
- Coil voltage 3VDC up to 24VDC
- Ambient temperature up to 110°C
- Sealed construction RTIII
- ATEX conformity
- Reinforced insulation according to IEC61010-2

MEAN WELL

Ultra wide 150-1500VDC Input DC/DC

In oil & Gas and renewable energy environments very often wide input solutions are required and have to be engineered. With this MEAN WELL DIN rail part a standard product is now available. Placed in an appropriate cabinet this product is the most suitable solution providing wide adjustable DC output.

Applications

- Photovoltaic power generation
- Wind turbine power generation
- High voltage frequency conversion applications

DDRH-60

Features & Benefits

- 150–1500Vdc 10:1 ultra wide input range
- 57mm slim width
- 4KVac I/O high isolation(Reinforced isolation)
- Output module: 5V/12V/24V/48V. Wide Vo adj. range 3–55Vdc
- Fully potted
- Cooling by free air convection
- Over Voltage Category II (OVC II)
- Operating altitude up to 5000 meters
- Operating temperature -30~+80°C
- Can be installed on DIN rail TS-35/7.5 or 15
- IEC62109-1 (LVD)
- 3 year warranty

OMRON

Relays for renewable energy applications

Relays for renewable energy applications have two target functions within the solar converter. The DC relays, to switch the DC voltage generated by the solar panel, and the AC relays with big contact gap, to switch the generated electricity to the power grid to provide the necessary safety “circuit-break-function”.

Applications

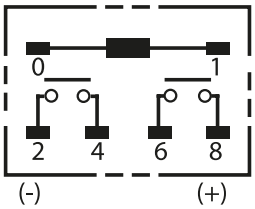
- Power conditioner inverter
- Industrial inverter
- Energy storage systems
- Photovoltaic power systems
- Uninterruptible power supply (UPS)
- Grid protection

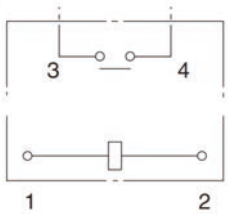
G7L-X REL

The G7L-X is a high voltage DC bi-directional switching relay with capability to switch up to 1000VDC. Key applications include residential and light commercial energy storage systems, battery management and DC link disconnect.

Features & Benefits

- 25A DC high capacity switching for both normal and reverse polarity
- Two poles wired in series to break or switch 600 to 1000 VDC
- Contribute to low power consumption
- UL and EN conformed
- Designed for safety with 6.0mm contact gap (two-pole series wiring)





G7EB RELAY

The new G7EB offers high performance with energy savings and contributes to reduced initial and maintenance costs by reduced heat rise for durable extended life. Industry standard footprint with two terminal options including castellated. Key applications: Grid Protection/AC Disconnect for Solar PV Inverter and UPS.

Features & Benefits

- 480 VAC/100 A high current switching capable
- Ambient temperature 85°C
- High impulse withstand voltage, 10kV
- Contact gap ≥3.6mm (Applied to VDE0126)
- Low initial contact resistance ≤5mΩ

G2RG-X RELAY

Omron Electronics G2RG-X PCB power relays are designed for inrush prevention in energy storage systems and are in a compact case with a 13.5mm x 29mm footprint. The G2RG-X relays achieve 500V 10A switching capacity used with 2-pole series wiring.

Features & Benefits

- Achieves 500VDC 10A switching capacity
- 3.0mm contact gap (2 pole series wiring) Insulation distance above 8mm
- Withstand voltage of 10kV between coil and contacts
- UL and TÜV certified

OMRON

OMRON

Relays for renewable energy applications

G9KB relay expands your design possibilities with a high DC load capability (600V 50A), designed to handle continuous carry current and provide highly effective non-polarized arc-controlled switching to maximise performance.

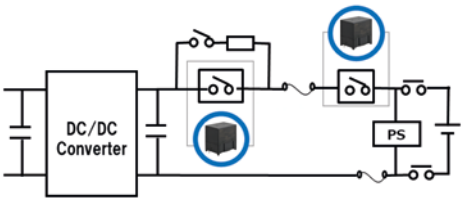
Applications

- Energy Storage System
- V2X (V2H, V2B, etc.)
- DC household appliances
- EV Charging
- Heavy Duty

G9KB series

Features & Benefits

- A high capacity of 600 VDC, 50 A and bidirectional opening
- and closing is achieved
- Ambient temperature 85°C
- Contact gap: 3.6 mm or more
- Low initial contact resistance ≤5 mΩ
- UL 60947-4-1 and EN 61810-10-certified (required for ESS switching devices)



Panasonic

HE-Series: Switching Large Amounts Of Power

More than ever before, domestic solar-power systems use relays to efficiently control the flow of current for local consumption via an inverter, to battery storage, or back into the power grid. Thanks to latest relay technology, Panasonic Industry enables the customer to use PCB technology for high current applications.

Applications

- Photovoltaic inverter
- Wind energy inverter
- Industrial motor control
- Uninterruptable power supply
- Energy self-sufficient housing

Panasonic Industry HE series for reliably and efficiently switching large amounts of power

Offering its HE-relays, Panasonic Industry Europe meets the growing demands for safe, robust and energy-efficient ways to switch relatively large amounts of power. This enables engineers now to use PCB technology for high current applications and at the same time realizing downsizing and energy saving at a new level.

Features & Benefits

- Switching current up to 120A AC (HE-N)
- Switching voltage up to 1,000VDC (HE-V)
- Galvanic separation, large contact gap
- Extreme low contact resistance
- Low coil power dissipation
- Temperature range: -40° to 85°C
- Conform to UL and VDE, further approvals on request

Series	HE-V	HE-S	HE-Y5	HE-Y6	HE-N(Y7)
Switching current	20A DC	35A AC	48A AC	90A AC	120A AC
Dimensions	41x50x39.4mm	30x36x40mm	38x33x36.3mm	38x33x38.8mm	50x40x43mm
Holding power*	210mW	170mW	310mW	310mW	400mW
Contact gap	3.8mm	3.2mm	2.5mm	3.0mm	3.6mm

*With reduced coil holding voltage

Sensata/Crydom

Sensata Technologies • Crydom

Solid state relays for smart buildings

Solid state relays can be used in a wide range of AC and DC applications. Ideal for smart building applications, SSR's are suitable for motion, power and lighting applications – especially for demanding applications that require higher levels of reliability.

Applications

- HVAC&R
- Lighting
- Access control
- Water and waste water treatments
- Alarm systems

CW Series Panel Mount AC output Solid State Relays

Features & Benefits

- Ratings from 10 A to 125 A at 24–280 VAC or 48–660 VAC
- LED status indicator
- UL/CSA/TÜV Approved, CE Compliant to EN60950-1
- AC or DC control and universal AC/DC control
- EMC compliant to Level 3
- Removable IP20 touch-safe cover

DR67 DIN Rail Mount Solid State Relay

Features & Benefits

- 3-Phase AC output DIN rail mount SSRs
- Output ratings up to 75 Amps at 600 VAC
- Over temperature protection w/alarm (optional)
- Built-in overvoltage protection
- AC or DC control
- cULus listed and VDE approved

DR22 Series AC Output DIN Rail Mount Solid State Relays

Features & Benefits

- Output ratings up to 35 Amps at 600 VAC
- Built-in overvoltage protection
- DBC substrate for superior thermal performance
- IP20 touch-safe housing
- AC or DC control
- Relay or contactor configuration
- C-UL-US and TÜV approved

DRH Series DIN Rail Mount Solid State Contactors

Features & Benefits

- Ratings up to 20 Amps at 600 VAC
- Fits standard 35mm DIN Rail
- Integrated over-temperature protection
- Alarm output in case of over-temperature
- Multicolor LED with input status and alarm indicator
- AC or DC control
- C-UL-US Listed, IEC Rated, CE & RoHS compliant, horsepower rated
- Built-in overvoltage protection

TE Connectivity's SCHRACK Relays

AUTHORIZED DISTRIBUTOR

Power relays for energy management

Power relays can be used to ensure that energy is only consumed when it is needed. The last person to leave the building can easily turn off all relevant groups of appliances, such as lighting and electricity for desks. Electrical bus systems in combination with relays can also be set to turn on lights automatically at 8am, or whenever employees arrive in the morning.

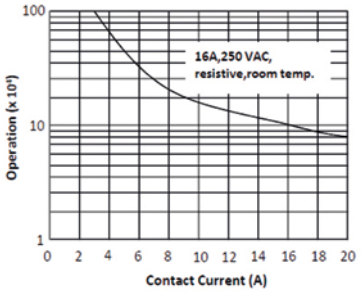
Applications

- PLC (programmable logic controllers)
- Measurement and control
- Home automation
- Machine control
- Energy control
- Input/output cards
- Timers
- Intelligent sockets

RE/REL & PE – 5/6A

Features & Benefits

- PE: 5A & 1 CO, RE/REL: 6A & 1 NO contact
- Sensitive coil 200/360mW
- Low height 10.6mm (REL: 12mm)
- PE: mono or bistable (latching) coil versions available
- PE: WG type available (IEC 60335-1)
- Miniature PCB relays with PCB area 200mm²
- Wash tight



OMIH – 10/16A

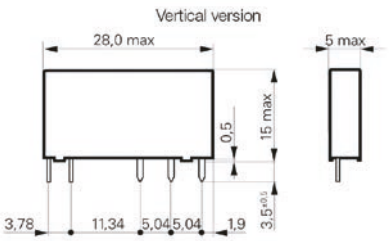
Features & Benefits

- 1pole 10/16A, 1 form A (NO) or 1 form C (CO) contact
- Meet 5000V dielectric voltage between coil and contacts
- Meet 10000V surge voltage between coil and contacts
- Can provide anti-explosion type => meet IEC-60079-15/GB3836.1-2010/GB3836.8-2014

V23092 – 6A

Features & Benefits

- 1pole 6A, 1 form C (CO) or A (NO) contact
- Sensitive coil 170mW
- Clearance/creepage between contact and coil ≥6/8mm
- Very slim: system width only 5.0mm/6.2mm (with socket)
- Reinforced insulation (protection class II)
- Flat pack version available



RT – 8/12/16A

Features & Benefits

- 8/12/16A and 1/2 form NO or CO contact
- DC and AC coils available
- Mono or bistable (latching) coil versions possible
- WG type available (IEC 60335-1)
- High ambient temperature version (105°C)
- THR (reflow) version available
- Sensitive version available

TE Connectivity's SCHRACK Relays

AUTHORIZED DISTRIBUTOR

High inrush current power relays (12-16A)

High inrush current relays offer a compact and powerful design solution for applications that require high inrush current resistance. They can withstand up to a 800A peak inrush current and are conform to industry safety standards and making them an ideal design solution for KNX-Bus and lighting applications.

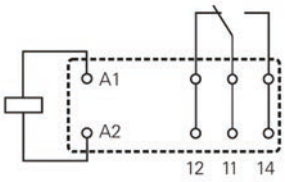
Applications

- Door control
- KNX Bus (Intelligent Sockets)
- Interface modules
- Air conditioning systems
- Heating systems
- LED lighting
- Filament & incandescent lamp loads
- Movement detectors & Motors

RZ/RZH (12A or 16A)

Features & Benefits

- 1-pole 12/16 A, 1 form C (CO) or 1 form A (NO) contact
- DC coil 400 mW
- Ambient temperature 85°C/RZH: 105°C
- 5kV/10mm coil-contact, reinforced insulation
- Product in accordance to IEC 60335-1
- RZ: Reflow version for THR mounting process



RZ-INRUSH (12A or 16A & 117A Inrush Current)

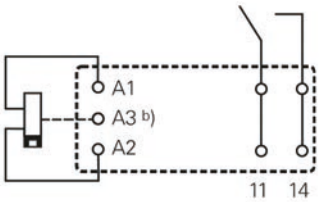
Features & Benefits

- 1-pole 12/16 A, 1 form C (CO) or 1 form A (NO) contact
- 5kV/10mm coil-contact, reinforced insulation
- Ambient temperature 85°C
- Product in accordance to IEC 60335-1
- UL TV-8 Rating: 117A inrush current

RTX (16A & 370A Inrush Current)

Features & Benefits

- 16A and 1 form NO
- Inrush peak currents up to 370A
- W pre-make contact + AgSnO2
- Bistable coil & reinforced insulation
- 140µF load, 16A/250V, 30000 operations
- 16A rated fluorescent load acc. EN60669-1
- 1 1/2 HP motor load acc. UL508



RT-iPOWER (16A & 165A/800A Inrush Current)

Features & Benefits

- 1-pole 16A, 1 form A (NO) contact
- AgSnO2 or W pre-make contact + AgSnO2
- Mono or bistable coil
- 5kV/10mm coil-contact
- Inrush peak currents up to 165A (20ms), 800A (200µs)
- WG version: product in accordance to IEC60335-1
- RTS3T: Electronic ballast UL508/NEMA 410 rated
- RTSET: 8A Electronic ballast rated

TE Connectivity's SCHRACK Relays

AUTHORIZED DISTRIBUTOR

Bistable/latching power relays (8-120A)

Power bistable relays can be used to switch applications in energy-saving manner. These relays retain their switched position if supply voltage fails, preventing loss of information on the current switching status. Just a short switching impulse of a few milliseconds is enough to switch the relay into a defined switch position.

Applications

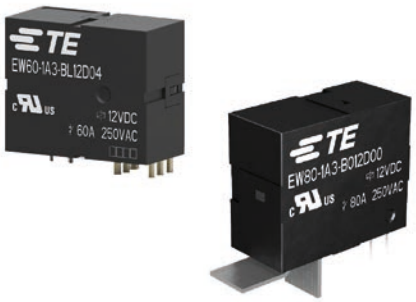
- Battery powered equipment
- Memory function (mains failure)
- Lighting control
- Bus actuator
- Circuit protection
- Inverters
- Electricity meters
- Prepaid power meters

RT1/RT2-Bistable

Features & Benefits

- 8/12/16A and 1/2 form NO/CO contact
- Rated Voltage: 250VAC
- 1 or 2-Coil versions
- 29x12.7x15.7mm (LxWxH)
- WG type available (IEC 60335-1)
- 5kV/10mm coil-contact

EW60/EW80



Features & Benefits

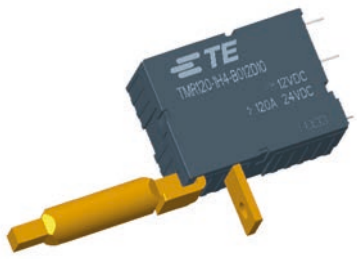
- 1-pole 60A/80A 1 form A (NO) contact
- Rated Voltage: 250VAC
- Polarized bistable (latching) with 1 or 2 coils
- 552A inrush, 2.1ms
- EW60: NEMA 410-2015, 16A, 347VAC
- EW80: Shunt implementation optional

TOU80

Features & Benefits

- 1-pole 80A, 1 form A (NO) contact
- Coil Voltage: 6/9/12/24VDC
- Rated Voltage: 250VAC
- Polarized bistable (latching) with 1 or 2 coils
- In accordance to IEC 62055-31 UC2
- Shunt implementation optional
- Meet IEC62055-31 UC3

TMR120



Features & Benefits

- 1-pole 120A, 1 form A (NO) contact
- Rated Voltage: 24VDC
- Polarized bistable (latching) with 1 or 2 coils
- Auxiliary switch optional
- Shunt implementation optional
- Various terminal configurations
- Meet IEC62055-31 UC3

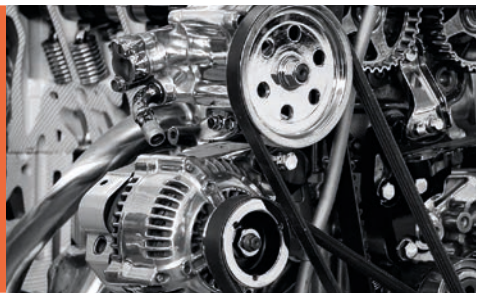
Automotive 12-24VDC Relays

OMRON

OMRON

Low voltage (12V) PCB automotive relays

The Omron automotive PCB relays have been designed to correspond with various automotive applications. These relays are suitable for motor control of automotive parts such as door lock motors, power window motors, washer and sunroof motors, typically for applications with short term operation.



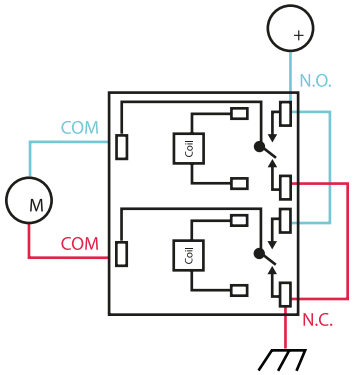
Applications

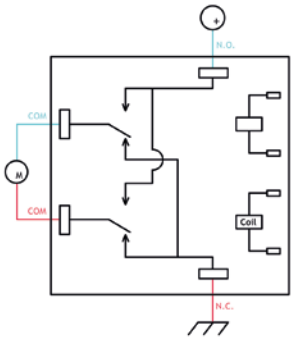
- Door lock motor
- Power window motor
- Wiper motor
- Washer motor
- Electrical seat adjustment
- Sunroof motor

G8NB (25A/5A, 1-Pole or 2-Pole SPDT)

Features & Benefits

- GM certified
- Maximum switching current 30A
- Standard, low or super low operating voltage
- Applicable to pin in paste reflow (through hole reflow)
- Terminal arrangement is same as G8N (replaceable)





G8NDL (25A/5A, 2-Pole H-Bridge)

Features & Benefits

- Reduced height (typ. 11.5mm)
- H-Bridge relay with small space to simplify board design
- Maximum switching current 30A
- Mechanical durability: min. 1 million cycles
- Applicable to pin in paste reflow (through hole reflow)

G8PM-1AW (45A, 1-Pole SPST)

Features & Benefits

- Ratings from 45 A at 14VDC
- Operating temperature range: -40°C +125°C
- Low contact resistance of typ. 2.6mΩ
- 1A (SPST) double contact
- Max applying current: 68A/1h

TE Automotive

Low Voltage DC automotive relays (40–175A)

TE automotive relays are engineered for DC voltages in passenger comfort and infotainment systems and power levels in harsh environments. Automotive relays are especially designed to provide switching functions that support modern electrical conveniences and advanced safety features in today's vehicles.

Applications

- Commercial vehicles
- Construction vehicles
- Buses
- Seat adjustment
- Automobiles
- Electric powertrain
- Off-road vehicles
- Prepaid power meters

F4/VF4A Shrouded (40A)

Features & Benefits

- 1 NO + 1 NC/2 NO/1 CO contacts
- 40A at 12V or 24V (85°C)
- Plug-in (F4&VF4A) or PCB terminals (F4)
- Pin assignment similar to ISO 7588 part 1
- Mini ISO Relay
- Integrated components (e.g. resistor, diode)
- Ambient temperature -40 to +125°C

F7 (70A)

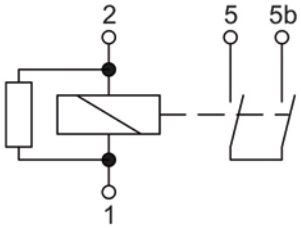
Features & Benefits

- 1 NO contact
- 70A at 12V or 24V
- Plug-in (F4&VF4A) or PCB terminals (F4)
- Maxi ISO Relay
- Integrated components (e.g. resistor, diode)
- Ambient temperature -40 to +125°C

HCR150 (130A)

Features & Benefits

- 1 NO/1 NC/1 CO/1NO DM contacts
- 130A at 12V or 24V (85°C)
- Current switching ability up to 300A (23°C
- Heat, moisture and vibration resistant
- Minimal contact resistance
- Dustproof and sealed versions



HCR200 (175A)

Features & Benefits

- 1 NC contact
- 175A at 12V (85°C)
- Current switching ability up to 245A (23°C)
- Integrated components resistor or diode
- Degree of protection: IP64 (IEC 60529)
- Ambient temperature -40 to +110°C

STANDEX MEDER

High voltage reed relay: KT Series

KT relay series from Standex Electronics is ideal for the economic applications that require high isolation properties together with reliable and precise switching. It is ideal for use in green applications, such as battery measurement systems, in photovoltaic technology or electro and hybrid vehicles.

Applications

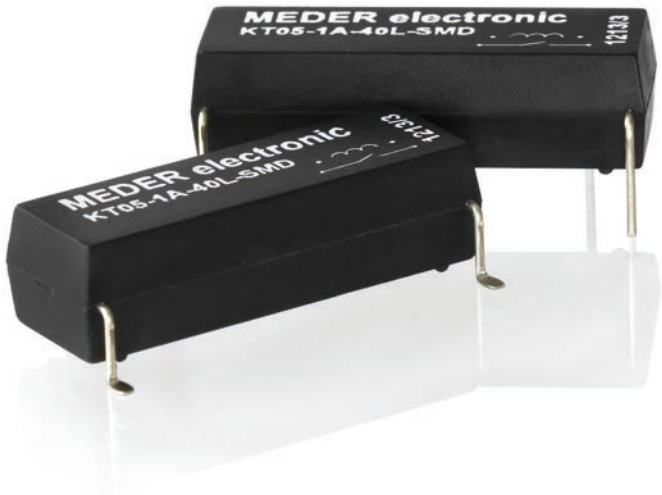
- Photovoltaic/solar systems
- Inverters
- Hybrid vehicles
- E-Mobility (battery management systems)
- Test and measurement
- Medical

KT Series of High Isolation Reed Relays for SMD & THT in a compact housing

It is particularly helpful in measuring isolation resistance and leakage currents across several electric circuits while providing great galvanic isolation. This is being used to prevent an injury, further current leakages and power loss. Can find its place also in medical or test & measurement equipment.

Features & Benefits

- Small size 30mm x 8.6mm x 10.6mm
- High isolation resistance of minimum 10^13Ω
- Breakdown voltage across open switch up to 5kVDC
- Dielectric strength coil/contact of over 7kVDC
- Low leakage current
- Switching voltages of 1.000V
- 1A switching current, 2.5A carry current
- Coil voltages 3V, 5V, 12V and 24V
- Available in THT and SMD
- Tested in accordance with AEC-Q200, UL-Listed
- Dynamically tested contacts can perform millions of reliable operations
- 5V coil and THT pinout recommended for automotive applications



Sensata/Cynergy3

High voltage reed relay: D-HR Series

Very high isolation voltages, up to 15kV, are achieved through the use of high vacuum reed switches. Rhodium or tungsten contacts make these relays suitable for high reliability applications, such as battery management systems, cardiac defibrillators, test equipment and high voltage power supplies.

Applications

- Battery management systems
- Cardiac defibrillators
- Test equipments
- High voltage power supplies

Features & Benefits

- 5kV, 7.5kV, 10kV or 15kV isolation
- Low contact resistance
- 1x10^14 Ωs minimum insulation resistance
- PCB or flying leads connections
- Switching voltages: 1kV, 3.5kV, 5kV, 7kV and 10kV
- Switching currents: 2A or 3A (depending on contact material)
- Carry current: 2A, 3A or 4A (depending on contact material)
- UL Approved

Panasonic

PhotoMOS® relays for xEVs

In the field of battery isolation monitoring, Panasonic Industry PhotoMOS® relays constructively surpass conventional electromechanical products in some crucial functionality aspects.

Applications

- Isolation monitoring
- Battery monitoring

Coming in PCB-efficient, miniaturized designs – 6 PIN DIP SMD AQV2*HAX for isolation monitoring and 8 PIN DIP SMD AQW2*HAX for other automotive switching purposes – they considerably stand out with their MOSFET-based semiconductor principle of non-aging contact resistance and hence unlimited switching cycles. Low CxR values, high optical isolation between input and output as well as DC and AC/DC load ratings constructively ensure contact reliability and operational safety of the switching requirements. Due to not being conceived on a mechanical but an optical principle, Panasonic Industry PhotoMOS® relays are unaffected by vibration, shock and other conditional effects – a fact that can be considered as utterly crucial within the steadily harsh automotive conditions of operation.

Features & Benefits

- Tested according to AEC-Q101
- Available for high voltage
- 1500V for AQV258HAX
- Minimal leakage current (typ. <1nA)
- Turn-on time: Max. 0.5ms – 1.0ms
- Turn-off time: Max. 0.5ms
- Input/output isolation up to 5kVrms
- Linear output characteristics
- No threshold voltage
- Stable on-resistance over the entire lifetime
- Compact housing
- Highly shock and vibration resistant

Series	U	I
AQV2*HAX	1.500V	20mA
AQW2*HAX	600V	40mA

Charging Stations/Wallboxes

HE-S relay for 35A with feedback contact

Thanks to the safety contact mechanism conform to EN 61851–1, the Panasonic Industry HE-S 35A relay offers an ideal switching solution for charging stations & wallboxes up to 22kW.

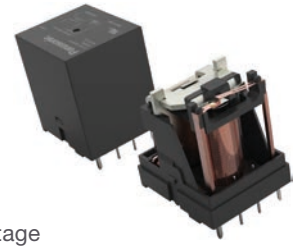
Applications

- Charging cable
- AC/DC wallbox
- AC/DC charging station
- Inverters
- Industrial equipment
- Uninterruptable power supply (UPS)
- Energy management

Able to handle a high resistive load of 35A to 277V AC for 50,000 cycles, this series constitutes the industry's smallest, high capacity multi-contact power relays. It also provides a mirror contact structure (EN60947-4-1 compliant) that uses 2FormA coupled with 1FormB contact assembly.

Features & Benefits

- Contact gap 3.2mm
- Ambient temperature -40 to +85°C
- 2FormA or 2FormA1FormB contact arrangement
- Max. switching voltage 480VAC
- Switching current 35A
- Dimensions 30x36x40mm
- Holding power 170 mW with reduced coil holding voltage



Charging Stations/Wallboxes

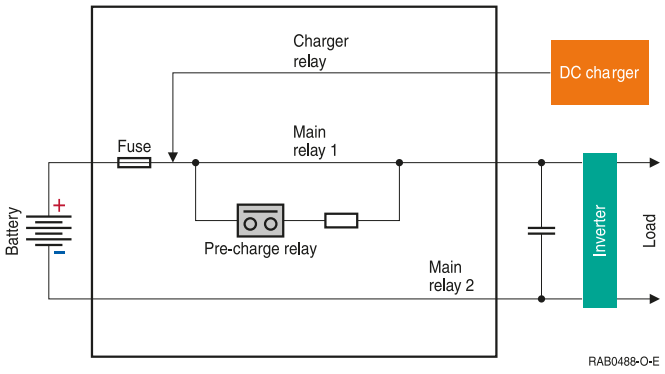
TDK

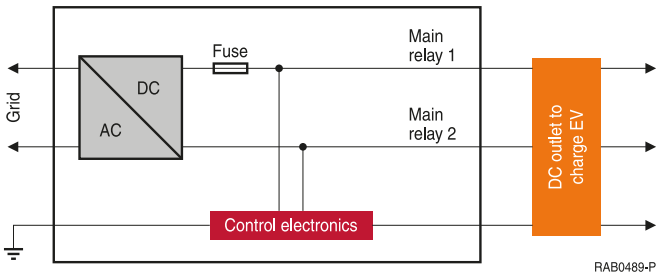
Charging & disconnection of HV batteries

TDK high voltage contactors are designed with excellent extinguishing characteristics and can be used bipolar for charging and discharging. It is further available as a dual-coil non-bipolar version for increased load-cycle performance.

Applications

- Battery management system/ Battery junction boxes for EV, buses and commercial vehicles
- Photovoltaic and energy storage systems – for DC tensions > 400 V
- DC charging stations for e-mobility applications
- Uninterruptable power supplies using HV batteries





HVC43 (250A)

Features & Benefits

- 1-pole: 1 NO contact
- No polarity of contact terminals
- Rated operational voltage: 450VDC

- Maximum operating voltage: 750VDC
- Continuous carry current: 250A
- 12VDC or 24VDC single coil

HVC200 (200A)

Features & Benefits

- 1-pole: 1 NO contact
- Rated operational voltage: 750VDC
- Maximum operating voltage: 1.000VDC

- Continuous carry current: 200A
- 12VDC or 24VDC single coil or double coil
- Auxiliary contacts available
- Higher operating voltage, different coil voltage, auxiliary contact, voltage sensor and temperature sensor upon request.

HVC300 (300A)

Features & Benefits

- 1-pole: 1 NO contact
- Rated operational voltage: 750VDC
- Maximum operating voltage: 1.000VDC

- Continuous carry current: 300A
- 12VDC or 24VDC single coil or energy saving double coil
- Auxiliary contacts available

HVC500 (500A)

Features & Benefits

- 1-pole: 1 NO contact
- Rated operational voltage: 750VDC
- Maximum operating voltage: 1.000VDC

- Continuous carry current: 500A
- 12V/24VDC single coil or double coil
- Auxiliary contacts available

TE Connectivity

TE Connectivity's 150/250/350A Contactors

ECK series high-voltage DC contactors are designed for control in new energy applications. They are hermetically sealed and enable high switching voltage up to 1000V.

Applications

- EV Charging,
- Electric vehicle
- AGV
- Electric forklift
- Energy storage Systems
- Photovoltaic inverter

ECK series

Features & Benefits

- Contact Switching Voltage: 1.000VDC
- Hermetically sealed with ceramic technology
- Built-in economizer, hold power 1,7W
- Maximum DC breaking current at 2.000A
- Comply with DC-1 utilization category in IEC60947-4-1

Panasonic

Panasonic INDUSTRY

40A PCB relay for 3 phase systems with feedback contact

HE-R relay is the first printed relay which can be used as the main switching element in 3 phase systems.

The IEC62955 compliant HE-R relay is able to switch 4x40A which is very suitable for Mode 3 charging applications.

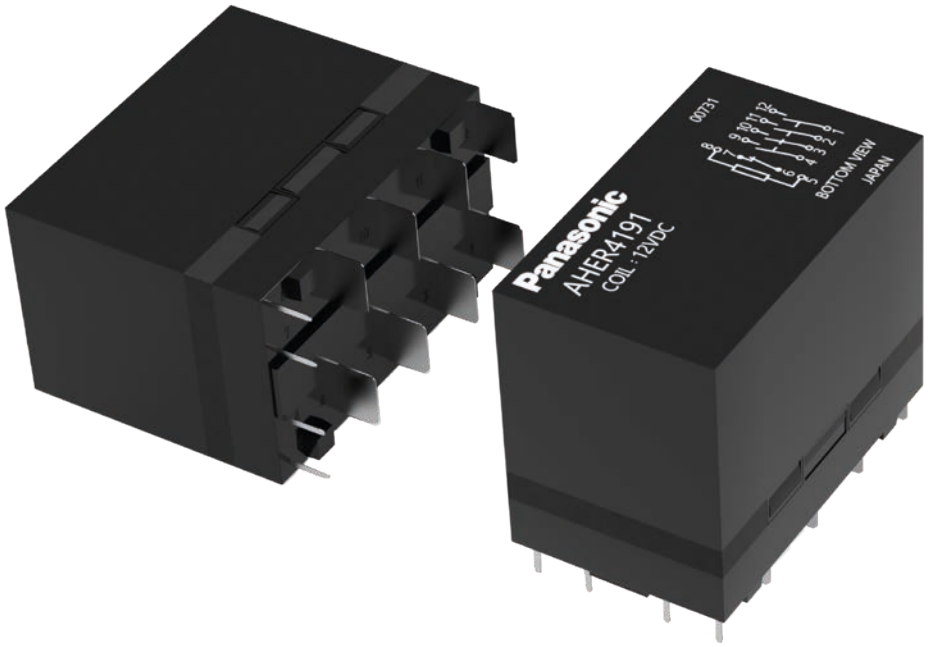
Applications

- EV Charging
- Inverter
- Industrial automation
- Heavy Duty

HE-R relay

Features & Benefits

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



OMRON

OMRON

G9KA PCB Power Relays

The G9KA benefits from an exceptionally low contact resistance for this class of relay at just 0.2mΩ, reducing the heat generated in the relay by over 30 percent compared with currently available equivalent devices. This facilitates thermal design and reduces design cost. The G9KA is also highly suitable for use in wallboxes, inverters and UPS systems.

Applications

G5V-1 Relay

- Power conditioner inverter
- Industrial Inverter
- UPS

G9KA

Features & Benefits

- 800 VAC/200 A breaking
- Ambient temperature 85°C
- High impulse withstand voltage, 10 kV
- Contact gap ≥4.0 mm (Applied to VDE0126)
- Low initial contact resistance ≤0.2 mΩ (when 200 A of current is applied)

Sensata/Crydom

Sensata Technologies • Crydom

Solid State Relays for DC Applications

Crydom DC output solid state relays are available with ratings of 3 to 100 Amps at 1 to 1000 VDC and solid state contactors with resistive current ratings of up to 160 Amps at 150 VDC and motor ratings of up to 25 FLA/3 HP at 150 VDC, on single channel and motor reversing configurations.

Applications

- DC motor control
- DC heating systems
- Inverters
- UPS systems
- Regulators
- Converters

1DC High Voltage Solid State Contactors

These high voltage solid state contactors have a long life and a broad range of benefits: no moving parts, minimal electrical noise, low power consumption, shock & vibration resistance, fast switching, low weight, galvanic isolation by Opto coupling, insensitivity to position, and more.

Features & Benefits

- Ratings from 7A to 40A at 200VDC and from 7A to 10A at 500VDC
- MOSFET Output
- UL Approved, CE compliant to EN60950-1
- Improved SEMS screw and washer
- Redesigned housing with anti-rotation barriers

PowerPlus Series Panel Mount DC Output

Crydom's new "PowerPlus DC Series" of DC output panel mounted solid state relays expands Crydom's Series 1 line of DC output SSRs with new features including an optional clear IP20 "touch safe" cover, LED input status indicator and higher speed switching circuit minimizing switching losses and permitting higher frequency PWM operation.

Features & Benefits

- Ratings from 10A to 40A at 200VDC and 10A & 20A at 400 VDC
- Relays are easily paralleled for higher-current applications
- UL Approved, CE compliant to EN60950-1
- Improved SEMS screw and washer
- Redesigned housing with anti-rotation barriers

SSC Series Panel Mount 1.000VDC Output

Series SSC solid state DC contactors feature IGBT technology for high voltage DC switching applications. All models come in Crydom's standard panel-mount package.

Features & Benefits

- Ratings up to 25A at 1000 VDC
- IGBT output
- CE Compliant to EN60950-1
- Improved SEMS screw and washer
- Redesigned housing with anti-rotation barriers

TE Connectivity's KILOVAC Contactors

AUTHORIZED DISTRIBUTOR

High Voltage and high current contactors 20A–1.000A

Designed for harsh environments and loads, the KILOVAC contactors from TE offer exceptional performance for a device this small and light. Therefore these contactors provide reliable and long-lasting performance in electrical vehicles, military ground, military and commercial aerospace and marine applications.

Applications

- Electric Vehicles
- (Solar) Inverters
- HV Test Equipment's
- Capacitor banks
- Battery management systems
- Energy storage systems
- Marine applications
- Military ground vehicles

Mini K-HV (Pre-charge Relay)

Features & Benefits

- 1-pole: 1 NO DM contact
- 20A at 400VDC
- Available with PCB and plug-in terminals
- Suitable for voltage levels up to 450VDC
- IEC 60664 compliant

LEV100H/EV200(B)

Features & Benefits

- LEV100H&EV200: 1 NO, EV200B: 1 NC contact
- LEV100H: 150A at 1.000VDC/EV200(B): 500A at 900VDC
- Optional auxiliary contacts
- Not position sensitive
- EV200: UL Recognized (File E208033)

EV600

Features & Benefits

- 1-pole: 1 NO contact
- 100A at 600VDC
- Bidirectional switching
- Withstands higher current pulse
- Increased current interrupting capability
- Form A auxiliary contact

K1K

Features & Benefits

- 1-pole: 1 NO contact
- 1.000A at 1.000VDC
- Bidirectional switching
- No contact oxidation over periods of non-use
- Bottom or buss bar mount
- Economizer with internal suppression

Flex Power Modules

DC/DC power solutions for rail – rolling stock

Flex Power Modules provides a series of power modules for railway systems designed to meet the most stringent electrical and environmental specifications.

Applications

- Monitoring and entertainment systems
- Lighting and information systems
- Broadcasting and communication systems
- Door and signal systems
- GPS and driving systems
- Sensors

These products can work under dust, moisture, severe vibration and other harsh conditions. DC/DC converters for rolling stock are also subject to greater demands for operational safety, durability and thermal shock.

Flex Power Modules offers ultra-wide 12:1 input range solutions rated from 50 to 200 W which are now required by many of our world-wide railway customers. For industrial applications, working from 12 or 24 V inputs, our forthcoming PNA series of Industrial Point of Loads housed in a small form factor and low-profile package offers customers increased design flexibility.

Features & Benefits

- Compliant to EN50155, an internationally recognized standard for rolling stock equipment
- Fully encapsulated converters
- Ultra-wide input ranges from 12-160 V
- Up to 4000 V isolation

Product	Series	V_{in}	V_{out}	P_{out}	I_{out}	Efficiency	Foot print
	PMU8000	4.5–17V	0.6–5V	–	4/6/8 A	Up to 95%	LGA
	PNA*	9–32V	0.9–5.5V	–	6A	89.7%	LGA
	PKM7100W	14–160V	3.3/5/12/ 13.8/15/24/ 48/54V	100W	–	87–90%	Quarter brick
	PKE7300A	43–160V	5/12/15/ 24/48/54V	30W	–	Up to 91%	2” x 1”
	PKJ7000	60–160V	12/13.8/15/ 24/48/54V	200–300W	–	89–91%	Half brick
	PKJ7200W*	14–160V	12/13.8/15 /24/48/54V	200W	–	88.5%	Half brick

*Soon to be released

Littelfuse

Time delay relays for railway applications

Electromechanical relay-output time relays are available with a number of different functions and assure isolation between input and output. SSR time relays have no moving parts to arc, a lifespan of up to 100x that of a relay-output timer. In addition, all solid state time delay relays are fully encapsulated to protect against shock, vibration and humidity, therefore ideal for Railway applications.

Applications

- Flashing light control
- Furnace safety purge control
- Motor soft-start delay control
- Conveyor belt sequence delay
- Power supply sequencing
- Oven ignitor controls

KRPS Series

Features & Benefits

- 1-pole: 1 CO contact
- Isolated 10A AC/DC output
- Microcontroller based
- Encapsulated to protect against shock, vibration and humidity

HRV Series

Features & Benefits

- 1-pole: 1 CO contact
- Isolated 30A AC output
- Switch selectable coin start
- Coin switch can be connected to a counter
- Encapsulated

TDB/TDBH/TDBL Series

Features & Benefits

- 1-pole: 1 CO or 2-pole 2 CO contacts
- 3 time ranges available (0.1s to 2.8h)
- Microcontroller based
- LED indication
- DIP switch adjustment
- Isolated output contacts

ASQU/ASTU Series

Features & Benefits

- 24 to 240VAC or 9 to 110VDC models
- Compact 17.5mm size
- Multifunction: 5 timing functions
- Knob adjustable time delay
- 0.7A steady, 10A inrush solid-state output
- Watchdog circuitry

Murata Power Solutions

Rail compliant DC/DC converters

For rolling stock compliance to EN50155 is a key feature. Murata's new range of products offer standard of the shelf solutions to meet the stringent requirements of this standard.

Applications

- Trains, buses and metros
- HVAC
- Door control
- Passenger information systems
- Window wiper
- Cabin heater
- Toilet cleaning system
- Warning circuits conductor

10:1 Input Brick Sized Solutions 50–250W

Features & Benefits

- Designed to meet EN50155
- 10:1 input
- Half brick 250W
- Quarter brick 150W
- Eight brick 120W
- Sixteenth brick 50W
- High efficiency
- DOSA compatible

IRV300 series 300W Input Range 10:1

Features & Benefits

- 16V–160VDC input
- Models 12V, 24V, 54V
- +15% adjustable
- EN50155 compliant
- 10ms holdup
- Oring

TE Connectivity's HARTMAN Contactors

AUTHORIZED DISTRIBUTOR

AC/DC contactors (28VDC/115VAC)

TE's HARTMAN AC&DC contactors are lightweight and environmentally sealed, with hermetically-sealed enclosures available for most severe environmental conditions or altitudes above 50,000 feet. Multiple main contact configurations and auxiliary contact configurations are available and meet the applicable requirements of MIL-PRF-6106 and/or specific customer specifications.

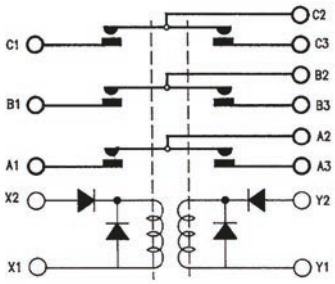
Applications

- Airliners
- Deep space probes
- Space shuttles
- Transformer rectifier units
- Starter/generators
- Military aircraft

D7, DH7, DHR7, DR7 (50A)

Features & Benefits

- 3-pole: 3 NO or 3 CO contacts
- 50A at 115/200 VAC, 400Hz
- Gasket sealed or Hermetically sealed
- D7, DR7: 50,000 ft/DH7, DHR7: 80,000ft
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



K400 (400A)

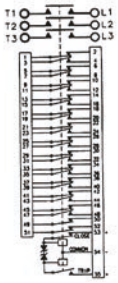
Features & Benefits

- 1-pole: 1 NO contact, double break
- 400A at 28VDC
- Buss bar or chassis mount design
- Gasket sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106

B-484 (500A)

Features & Benefits

- 3-pole: 3 NO contacts
- 500A at 115/200 VAC, 400 Hz
- Magnetic Latching
- Gasket sealed
- Auxiliary contacts available
- Meets many requirements of MIL-PRF-6106



A-791M (1.000A)

Features & Benefits

- 1-pole: 1 NO contact
- 1.000A at 28V DC
- Reverse current protection for DC starter/generators
- Main contactor coil: economized
- High Reliability
- Meets many requirements of MIL-R-610

Teledyne Relays

TELEDYNE RELAYS
Everywhereyoulook™

5A, 270VDC, Trip Output Status Feedback, Short-Circuit Protected High Voltage DC Solid-State

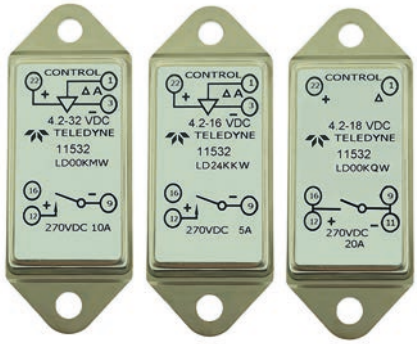
This solid-state relay utilizes the latest technology to provide a low ON resistance and an optically isolated output. The control (input) and load (output) are optically isolated to protect input logic circuits from voltage and current transients which can occur on the output supply.

Series LD24KK

The optical isolation also provides a full floating output, thus allowing the load to be connected to either output terminal. The control circuit is buffered to enable the relay to be driven directly from standard CMOS or open collector TTL logic circuits. Short-circuit and current overload protection features provide complete protection for both the relay and the system wiring. This feature not only provides protection, should a short or overload occur while the relay is on, but will also provide protection should the relay be switched on into a short. In either case, the relay will sense the short-circuit condition, then block it indefinitely until the short is removed and the unit is reset by cycling the input control. The trip status returns a logic 0 (low) if the output trips off and a logic 1 (high) when the output is in a normal mode (on or off).

Features & Benefits

- Short-circuit/current overload protection
- Trip status output
- TTL and CMOS compatible control
- Low ON resistance power FET output
- Fast switching speed
- Meets 270 VDC system requirements of MIL-STD-704
- Optical isolation
- Low profile hermetic package
- Built and tested to the requirements of MIL-PRF-28750
- Available in ‘W’ and ‘Y’ screening levels



Part Number	Description
LD24KKW	Solid State Relay with Short Circuit Protection and Trip Status
LD24KKY	Solid State Relay with Short Circuit Protection and Trip Status

The Y suffix denotes parameters tested to MIL-PRF-28750 Specifications.
The W suffix denotes parameters tested to Teledyne Specifications.

Environmental and physical specifications

Part Number	Min	Max	Units
Temperature Range			
Operating	-55	+125	°C
Storage	-55	+125	°C
Vibration, 100 g*	10	3000	Hz
Constant Acceleration		5000	g
Shock, 0.5 ms pulse*		1500	g
Dielectric Strength @ 25°C	1000		V_{AC}
Insulation Resistance @ 500 Vdc @ 25°C	10^9		Ω
Thermal Dissipation Properties			
Output Junction Temperature @ ILOAD = IMAX RATED*		+145	°C
Maximum Junction Temperature (TJ Max)*		+150	°C
Thermal Resistance Junction to Ambient ($ø_{JA}$)*		30	°C/W
Thermal Resistance Junction to Case ($ø_{JC}$)*		5	°C/W

*Parameter Guaranteed by Design, but not tested.

TE Connectivity's CII Relays

AUTHORIZED DISTRIBUTOR

Hermetically sealed military relays

CII high performance signal level and mid-range Relays are designed to perform in a wide range of extreme environments in aerospace, military electronics for fighting armored vehicles and commercial applications. Both mil-spec and commercial versions of these hermetically-sealed Relays are offered.

Applications

- Ground vehicles
- Weapons systems
- Ground support equipment
- Fuel pumps
- Avionics main power feed
- Power distribution & motion control

1MS (1A)/HFW (2A) Relay

Features & Benefits

- 1MS: 1-pole: 1 NO/HFW: 2-pole CO contacts
- 1MS: 1A/HFW: 2A at 28VDC
- 1MS: MIL-R-39016/10HFW: MIL-R-39016/6
- High shock & vibration ratings
- Excellent RF switching
- Safe for application in harsh and explosive environments

FC-325 Relay (25A)

Features & Benefits

- Excellent for switching harsh inductive, motor, and lamp loads
- Switching voltages of 1.000V
- -70°C to +125°C temperature range
- 25km/80.000 feet altitude rating
- Qualified to MS27418 specifications
- Higher current ratings than standard M83536 mid-range relays

FCA-150 Relay (50A)

Features & Benefits

- 1 Form X (SPST-NO-DM) contact
- 50 A switching capability
- 50,000 cycles under resistive load
- Rated for altitude to 300,000ft.
- -70° to +125°C temperature range
- Available with 1 Form C (SPDT) 2A auxiliary contact

FCC-360 Contactor (60A)

Features & Benefits

- 60A contact rating with 10 x rupture current
- Gasket sealed/2A Aux contact rating
- Double make contact design for less wear and tear on contact
- Utilizes economized coil
- 15 milliseconds operating time
- Designed to performance requirements in MIL- PRF-610628

TE Connectivity's KILOVAC Contactors

AUTHORIZED DISTRIBUTOR

TE contactors for harsh environments

Designed for harsh environments and loads, the KILOVAC contactors from TE Connectivity (TE) offer exceptional performance for a device this small and light. Therefore these contactors provide reliable and long-lasting performance in military ground, military and commercial aerospace, and marine applications.

Applications

- Military ground applications
- Military aerospace
- High-voltage DC converter systems
- Marine applications
- Power distribution & motion control
- Battery management systems

CAP120/CAP202

Features & Benefits

- CAP120: 1 NO/CAP202: 2 NO contacts
- CAP 120: 150A at 600VDC/CAP202: 350A at 900VDC
- Bidirectional switching
- Integrated dual-coil electronic economizer
- 2 or 4 auxiliary contacts available at CAP202
- Coil suppression for EMC compliance

MAP100/MAP200

Features & Benefits

- 1-pole: 1 NO contact
- MAP100: 100A/MAP200: 500A at 900VDC
- Hermetically sealed – intrinsically safe
- Not position sensitive, can be mounted in any orientation
- Auxiliary contacts available
- No contact oxidation during long periods of non-operation

KCS01/KCS03 (With Current Sensing Sensor)

Features & Benefits

- 1-pole: 1 NO contact
- KCS01: 100A/KCS03: 600A at 600VDC
- Bidirectional switching
- Saves space by eliminating the need for external sensor
- Extremely small size & weight (KCS01:145g/KCS03:500g)
- EMC compliant: no radiated coil emissions

KHR500

Features & Benefits

- 1-pole: 1 NO contact
- 600A at 1.000VDC
- 3.300 A break at 400 Vdc
- Capable of handling inrush currents as high 4.000 A
- UL 508 recognized for US and Canada
- Safe for application in harsh and explosive environments

MEAN WELL

HEP Series

Military Communications are life critical and need to be 100% reliable – always. In every situation including rough handling of the gear, very harsh environments, temperature and mechanical shocks the equipment needs to function immediately. MEAN WELL HEP series offers COTS for these demanding applications

Applications

- Military application
- Outdoor telecommunication equipment
- Robotic/AGV
- Electronic transportation vehicle
- Outdoor electronic signage and billboard
- Harsh environment battery charger

HEP Series

Features & Benefits

- Series: HEP-100/150/185/240/320/480/600/1000
- Output voltage: 12,15,24,36,48,54
- Universal AC input: 90~264VAC
- Low profile: 26 to 41mm (H)
- Active PFC function
- Fanless design
- Battery charging function: (HEP-600C and HEP-1000)
- Vibration test: 10G
- Operating altitude up to 5000m
- Wide working temperature: -55~+70)°C
- Communication protocol PMBus® and CANBus® optional (for HEP-1000).
- High efficiency up to 96%
- IP-65 (optional IP-68)

Teledyne Relays

TELEDYNE RELAYS
Everywhereyoulook™

High-temperature (200°c), high-performance to-5 relay DPDT

The TO-5 relay, originally conceived and developed by Teledyne, has become one of the industry standards for low-level switching from dry circuit to 1 ampere.

Applications

- High temperature industrial and process control instrumentation
- Oil exploration (down hole) instrumentation

Series 412H/422H/432H

Designed for high- density PC board mounting, these TO-5 relays are some of the most versatile ultraminiature relays available because of their small size and low coil power dissipation.

The H Series high-temperature TO-5 relays are designed for reliable operation in elevated ambient temperatures up to 200°C. Special material selection and processing provide assurance of freedom from contact contamination and mechanical malfunctioning that might otherwise be caused by ultra high ambient temperature conditions.

By virtue of its inherently low intercontact capacitance and contact circuit losses, the H Series relays have proven to be excellent ultraminiature RF switches for applications with frequency ranges well into the UHF spectrum.

Part number	Relay type
412H	DPDT High-Temperature relay
422H	DPDT Magnetic-Latching, High-Temperature relay
432H	DPDT Sensitive, High-Temperature relay

412H/432H

Environmental and physical specifications

Temperature		-65°C to +200°C
Vibration*		30 g's, 10 to 3000Hz
Shock*		75 g's 6msec, half-sine
Acceleration		50 g's
Enclosure		Hermetically sealed
Weight	412H	0.09 oz. (2.55g) max.
	432H	0.15 oz. (4.25g) max.

422H

Environmental and physical specifications

Temperature	-65°C to +200°C
Vibration*	30 g's, 10 to 3000Hz
Shock*	100 g's 6msec, half-sine
Acceleration	50 g's
Enclosure	Hermetically sealed
Weight	0.10 oz. (2.84g) max.

*Relay contacts will exhibit no chatter in excess of 10 µs or transfer in excess of 1 µs.

Teledyne Relays

TELEDYNE RELAYS Everywhereyoulook™

SMT, DPDT Non-Latching Commercial Electromechanical Relay

The Series S114 Surface Mount Centigrid® Relay is an ultraminiature, hermetically sealed, armature relay.

Series S114

The low profile height (.360") and .100" lead spacing make it ideal for applications where extreme packaging density and/or close PC board spacing are required. The specially formed leads are pre-tinned to make the relays ideal for most types of surface mount solder reflow processes.

The basic design and internal construction are identical to the Series 114 Centigrid® relays, and are capable of meeting Teledyne Relays' T2R® requirements.

The following unique construction features and manufacturing techniques provide overall high reliability and excellent resistance to environmental extremes:

Features & Benefits

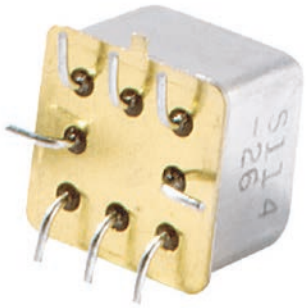
- All welded construction.
- Unique uni-frame design providing high magnetic efficiency and mechanical rigidity.
- High force/mass ratios for resistance to shock and vibration.
- Advanced cleaning techniques provide maximum assurance of internal cleanliness.
- Precious metal alloy contact material with gold plating assures excellent high current and dry circuit switching capabilities.

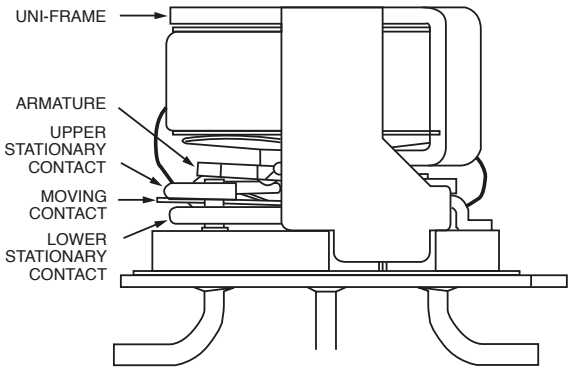
The Series S114D relays have internal discrete silicon diodes for coil suppression and polarity reversal protection.

Series	Relay type
S114	DPDT, surface-mount w/ J-Leads, non-latching relay
S114D	DPDT, SMT w/ J-Leads, non-latching relay with internal diode for coil transient suppression

Environmental and physical specifications

Temperature (Operating)	–55°C to +85°C
Vibration[1]	30 g's to 3000 Hz
Shock[1]	50 g's, 6ms half sine
Acceleration	50 g's
Enclosure	Hermetically sealed
Weight	0.15 oz. (4.3g) max.
Reflow Temperature	260°C max. temp. 1 min. max





[1]Relay contacts will exhibit no chatter in excess of 10 µs or transfer in excess of 1 µs.

Teledyne Relays

TELEDYNE RELAYS
Everywhereyoulook™

Miniature DC–18 GHz/DC-22 GHz Failsafe SPDT Coaxial Switch

The CCR-33S/CR-33S is a broadband, SPDT, electromechanical, coaxial switch designed to switch a microwave signal from a common input to either of two outputs. The characteristic impedance is 50 Ohms. The small switches incorporate SMA connectors.

Series CCR-33S/CR-33S

The CCR-33S/CR-33S series switch is offered with a failsafe actuator. This design is compatible with the two most common mounting hole patterns.

The CCR-33S/CR-33S series switch is interchangeable with a variety of switches.

RoHS Compliant

Environmental and physical specifications

Operating Temperature Commercial Model, CCR-33S Elite Model, CR-33S***	 –25°C to 65°C –55°C to 85°C
Vibration (MIL-STD-202 Method 214, Condition D, non-operating)	10 g's RMS
Shock (MIL-STD-202 Method 213, Condition D, non-operating)	500 g's
Standard Actuator Life Actuator Life w/ Additional Features	5,000,000 cycles 1,000,000 cycles
Connector Type	SMA
Humidity (Moisture Seal)	Available
Weight	1.65 oz. (46.78g) (max.)

Part Number	Description
CCR-33S	Commercial Failsafe SPDT, DC-18GHz
CR-33S	Elite Failsafe SPDT, DC-22GHz

Electrical characteristics

Form Factor	SPDT, break before make
Frequency Range CCR-33S CR-33S	 DC–18 GHz DC–22 GHz
Characteristic Impedance	50 Ohms
Operate Time	10 ms (max.)
Release Time	10 ms (max.)
Actuation Voltage Available	12 15 24 28 V
Actuation Current, max. @ ambient	200 250 120 90 mA

Available with USB & Ethernet Control!

Typical performance characteristics

Frequency	DC–3 GHz	3–6 GHz	6–12 GHz	12–18 GHz	18-20 GHz	20-22 GHz
Insertion Loss, dB, max.	0.2	0.2	0.4	0.5	0.6	0.6
Isolation, dB, min.	70	70	60	60	50	50
VSWR , max.	1.25:1	1.25:1	1.4:1	1.5:1	1.6:1	1.6:1

TE Connectivity's KILOVAC Relays

AUTHORIZED DISTRIBUTOR

High voltage relays (3.5kV – 15kV)

TE's KILOVAC HV relays are resistant to shock, vibration and extreme temperature levels. Many of these relays are hermetically sealed and can be operated in high humidity or in potentially explosive atmospheres. The very short operating time makes HV-relays suitable for RF-applications like in transmitters and antenna tuners.

Applications

- Broadcast
- Military Communication
- Automated test systems (ATE)
- High-voltage measurement
- Charging and discharging of capacitors
- Medical technology (X-ray, MR)

H-14/H-16 (12kV)

Features & Benefits

- 2-pole: 2 CO contacts
- 30A at 12kV (DC or 50/60Hz AC), H-14: 8A at 32Mhz, H-16: 4A at 32Mhz
- Contact Resistance: H-14: 0.015Ω, H-16: 0.03Ω,
- Widely used as a transmit/receive switch
- Meets requirements of MIL-R-83725

HC-1/HC-3/HC-5 (3.5kV)

Features & Benefits

- 1-pole: 1 CO contact
- Carry Current: HC-1: 25A, HC-3: 18A, HC-5: 8A
- Widely used for RF applications
- Contact Resistance: HC-1: 0.01Ω, HC-3: 0.02Ω, HC-5: 0.50Ω
- HC-1 & HC-3: Meets requirements of MIL-R-83725

HC-2/HC-4/HC-6 (8kV)

Features & Benefits

- 1-pole: 1 CO contact
- Carry Current: HC-2: 25A, HC-4: 15A, HC-6: 8A
- Stable, low contact resistance
- Contact Resistance: HC-2: 0.01Ω, HC-4: 0.02Ω, HC-6: 0.05Ω
- HC-2 & HC-4: Meets requirements of MIL-R-83725

KC-2/KC-11 (15kV), KC-14/KC-18 (15kV) and KC-15/KC-16 (15kV)

KC-2/KC-11 (15kV) (KC11=threaded base version of KC2)

- 1-pole: 1 CO contact
- Carries 50A at 15kV DC or 50/60Hz AC or 10A at 7kV 32Mhz AC

KC-14/KC-18 (15kV) (K18= threaded base version of KC14)

- 1-pole: 1 CO contact/Meets requirements of MIL-R-83725
- 30A at 15kV (DC or 50/60Hz AC)

KC-15/KC-16 (15kV) (KC16= threaded base version of KC15)

- 1-pole: 1 CO contact/Meets requirements of MIL-R-83725
- 12A at 15kV (DC or 50/60Hz AC)

TE Connectivity's KILOVAC Relays

AUTHORIZED DISTRIBUTOR

High voltage relays (5–70kV)

TE's KILOVAC high voltage relays have safely and reliably helped manage a variety of high voltage applications. These small, lightweight relays are used extensively in aerospace, space, subsea and military applications like broadcast & communications as well as a variety of ground-based applications.

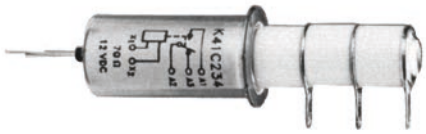
Applications

- Broadcast
- Military communications
- Automated test systems (ATE)
- Charging and discharging of capacitors
- High-voltage measurement
- Medical technology (X-ray, MR)
- Aerospace & avionics
- HF communication equipment

K41C (5kV)

Features & Benefits

- 1-pole: 1 CO contact
- 30A at 5kV DC or 50/60Hz AC or 12A at 2.8kV 32Mhz AC
- Contact resistance max. 0.02 Ω
- RF ratings to 32 MHz
- Meets requirements of MIL-R-83725
- QPL version available, M83725/23



K81C (10kV)

Features & Benefits

- 1-pole: 1 CO contact
- 10A at 10kV (DC or 50/60Hz AC)
- Contact resistance max. 0.05 Ω
- Vacuum dielectric for power switching low current loads
- PCB solder connection or flying leads)

K60C (35kV)

Features & Benefits

- 1-pole: 1 CO contact
- 10A at 35kV (DC or 50/60Hz AC)
- Operating temperature range: -55°C to +85°C
- Smallest 35kV rated relay available
- Mechanical life — 1 million cycles

K70C (70kV)

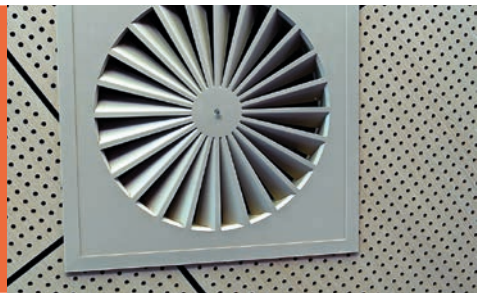
Features & Benefits

- 1-pole: 1 CO contact
- 10A at 70kV DC or 30kV 50/60Hz AC
- Contact resistance max. 2 Ω
- SF-6 gas-filled for high voltage isolation applications
- Suitable for charging and discharging of HV capacitors
- Mechanical life — 500k cycles

MEAN WELL

Medical Adapters

Short time to competitive markets doesn't go well together with certification. Using high quality standard Adapters tackles this problem. The adapter has been designed, tested and certified. The application can be made for SELV environment.



Applications

- Home healthcare appliances
- Ventilators
- Breathing machine
- Portable hemodialysis machine

GEM Series

Features & Benefits

- Various DC plug quick adapter accessory available
- Series: GEM-06/12/18/30/40/60
- Output voltage: 5,7.5,9,12,15,18,24,48
- Universal AC input: 90~264VAC
- Interchangeable AC plugs
- 2 X MOPP medical safety
- Extremely low leakage current
- No load power consumption should be <0.075~0.3W based on different power
- Energy efficiency level V
- Class II
- 3 year warranty

GSM Series

Features & Benefits

- Series: GSM-06/12/18/25/36/40/60/90/120/160/220
- Output voltage: 5,7.5,9,12,15,18,24,48 *
- Universal AC input: 90~264VAC
- Global certifications
- 2 X MOPP medical safety
- Extremely low leakage current
- No load consumption should be: <0.1W~0.15W
- Wide range working temperature: -30 ~+70°C
- Energy efficiency Level VI
- Class II and class I
- 3 year warranty

Advanced Energy

Configurable power

Medical devices require a wide variety of voltages and benefit from flexible, high efficiency power products enabling a short design cycle. Medical certified products simplify safety compliance. Smart fan technology or conducted cooling minimize the troubles caused by thermal challenges.

Applications

- X-Ray equipment
- MRI Scanner
- Cosmetic/aesthetic equipment
- Surgical robotics
- Surgical lasers
- Electroporation

Cost efficient – uMP Series

Features & Benefits

- Up to 1800W
- Up to 12 outputs
- High density
- Cost efficient

High Precision – iHP Series

Features & Benefits

- 12kW and 24kW racks
- 4 or 8 individual outputs per rack
- Fully digital controlled
- Combine outputs up to 1000V/1600A

Compact – CoolX platform

Features & Benefits

- 600W, 1000W fanless
- 1800W ultra compact with fans
- 3000W with fans up to 24 isolated outputs
- 4/6 slots
- Suitable for BF applications
- 5 or 12V AUX always on

Flexible – Ultimod platform

Features & Benefits

- Off-the-shelf front end in standard chassis
- Off-the-shelf modules slide in providing DC output
- 4 slot chassis 750W/6 slot chassis 1340W
- Choice of 25 modules
- Floating outputs
- Configuration following engineering can be ordered pre assembled with unique part number

Advanced Energy

Fanless operation

Medical devices require a wide variety of voltages and benefit from flexible, high efficiency power products enabling a short design cycle. Medical certified products simplify safety compliance. Smart fan technology or conducted cooling minimize the troubles caused by thermal challenges.

Applications

- X-Ray equipment
- MRI Scanner
- Cosmetic/aesthetic equipment
- Surgical robotics
- Surgical lasers
- Electroporation

Convection cooled – CS1000

Features & Benefits

- Compact, fanless 1000W solution
- 24 or 48 V adjustable
- 5 or 12V AUX always on
- Suitable for BF applications

Conduction cooled LCC Series

Features & Benefits

- 250W and 600W available, 1200W under development
- No need for cooling fans
- IP65 versions available
- Digital control

CNS650

Features & Benefits

- Medical and ITE safety approvals 2x MOPP
- PMBus® interface
- Total power: 650 watts
- Input voltage: 90 – 264V

Littelfuse/IXYS

Semiconductor relays for medical applications

Medical applications like isolation current monitor circuits for higher voltage systems require high blocking voltage, low off-state leakage current relays with high input-to-output isolation rating to prevent potential lethal current conduction to the system chassis.

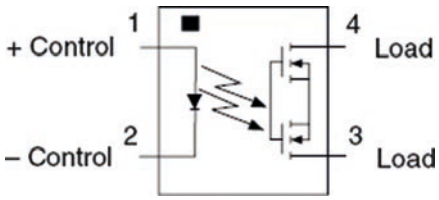
Applications

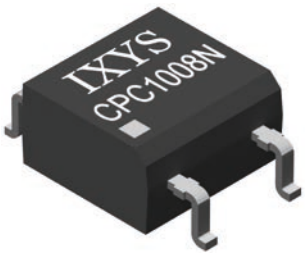
- Patient/equipment isolation
- Instrumentation
- Multiplexers
- Data acquisition
- Medical equipment
- Electronic switching
- Security systems
- Reed relay replacement

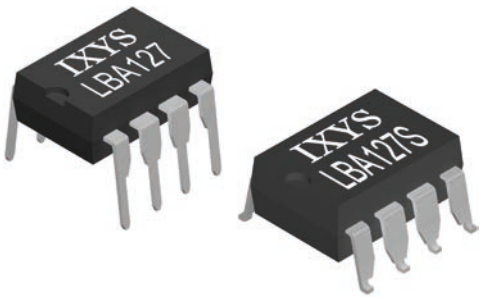
CPC1008N (100V AC peak or DC, 150mA)

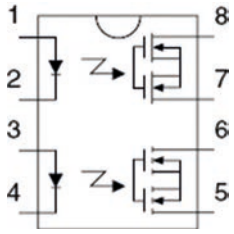
Features & Benefits

- 1-pole: 1 NO output in 4-pin SOP
- Load currents up to 150mA at 100V AC/DC
- 1500VRMS input/output isolation
- Fulfills low drive power requirements
- Flammability rating UL 94 V-0









LBA127 (200V AC peak or DC, 200mA)

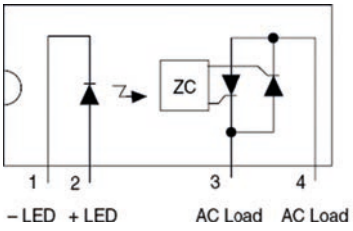
Features & Benefits

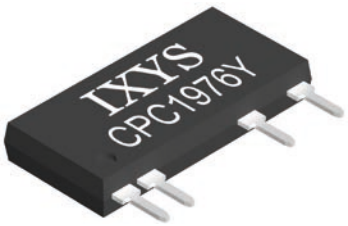
- Dual-pole relay: 1 NO + 1NC output
- Load currents up to 200mARMS or DC
- 3750VRMS input/output isolation
- Small 8-pin package
- VDE & FCC compatible

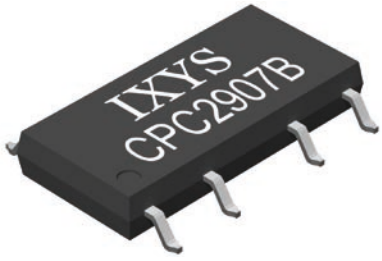
CPC1976Y (240VAC, 2ARMS)

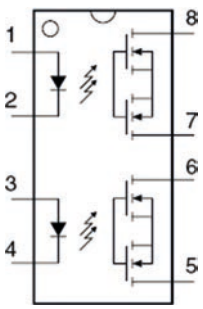
Features & Benefits

- 1-pole: 1 NO output
- Load currents up to 2ARMS at 20–240VAC
- 600VP blocking voltage
- 5mA LED input sensitivity
- Zero-crossing turn-on
- TTL and CMOS compatible









CPC2907B (60V AC peak or DC, 2A)

Features & Benefits

- Dual-pole relay: 1 NO + 1NO output
- Load currents up to 2ARMS or DC at 60V AC peak or DC
- Low on-resistance: 150mΩ Max.
- 4000VRMS input/output isolation
- 8-pin SOIC surface mount package

MEAN WELL

Modular power 650/1200W

Modern medical devices requiring multiple voltage rails with a high degree of flexibility are developed more easy by selecting modular power supplies. Virtually any combination of voltages and currents is possible within the power range provided by the chosen chassis size.

Applications

- Medical screen
- Diagnostic equipment
- Test & measurement equipment
- Medical communication equipment

NMP Series

Features & Benefits

- 650W and 1200W
- Case 1U height, efficiency up to 91%
- Medical grade 2xMOPP
- Output module: 5V/12V/24V/48V. Wide Vo adj. range 3–55Vdc
- PV & PC functions via external DC signal
- Built-in active current sharing function
- Auxiliary output: 5V at 2A (NMP-1K2)/5V at 1.5A (NMP-650)
- Cooling by thermostatically controlled fan
- Operating temperature -30~+70°C
- Safety approval: ANSI/AAMI ES60601-1, TÜV EN60601-1, IEC60601-1(ed. 3.1), DUL62368-1, TÜV EN62368-1
- 5 year warranty

Murata Power Solutions

U Frame medical power supply

Cooling fans often are most unwanted in Medical devices. Murata's superior thermal design allows 450W without any fans. Power boost gives 800W peak power for 30 seconds during start-up – enabling, for example, motors to start-up reliably.

Applications

- Hospital communication system
- Hospital bed
- Mobile x-ray equipment
- Ultrasound devices
- Mobile computing unit

PQU650 Series

Features & Benefits

- Wide AC input global coverage
- Models 12, 24, 28, 48, 54 VDC output
- 6" x 4" x 40mm U channel
- 450W convection
- 650W fan cooled
- Medical approved
- Also 250W available
- 48V and 54V suitable for POE
- 800W power boost for 30s

Panasonic

PhotoMOS® relays for medical and health care devices

Modern, light-weight and mobile health care devices, such as endoscopes, blood pressure gauges or ultrasonic diagnostic equipment require components coming in miniaturized designs for saving PCB space – but nonetheless securing flawless lifetime reliability.

Applications

- Blood pressure gauge
- Ultrasonic diagnostic equipment
- Endoscope systems

PhotoMOS® are solid state relays with MOSFET output featuring low off-state leakage current and stable on-resistance over component lifetime.

Longtime life-cycles through unlimited contact operations and a reliable non-aging contact resistance render the compact AQY210S and AQY280 suitable components for signal control and sensor input transmission of next-generation blood pressure gauges – respectively for I/O signal switching in diagnostic endoscope systems. For signal control and the scanner circuit inside ultrasonic devices, the AQY22*R* PhotoMOS® would be the relay of choice as it ensures a continuously high operational speed and high frequency signal switching while coming in a compact housing.

But also x-ray or CT equipment profit from Low CxR values, high optical isolation between input and output, and DC and AC/DC load ratings and a corresponding operational safety of the switching requirements.

Features & Benefits

- Extremely long lifetime
- Smallest packages enables PCB size reduction
- High reliability without aging of contacts
- Low CxR types
- Suitable for high frequency switching

Series	U	I
AQY210S	60–400V	100–500mA
AQY280	350V	80–500mA
AQY22*R*	60–80V	150–500mA

Sensata/Crydom

Sensata Technologies • Crydom

Solid state relays for medical applications

Components used in the medical industry must be reliable and must sustain high frequency switching. Crydom manufactures a wide range of solid state relays offering precision, reliability and quiet operation making them an ideal choice for temperature, motion and power control in medical applications.

Applications

- Medical small pumps
- Incubators
- Electric hospital beds
- Dialysis machines
- Warmers for blood transfusion equipments
- Sterilizers and ovens

DRA3 Solid State Contactors

All the DRA3P series models are C-UL-US recognized. The DRA3P three phase solid state contactor is available in 2 configurations, with 2 or 3 controlled legs for added flexibility. In the case of the version with 2 controlled legs, the third leg is linked internally.

Features & Benefits

- 2.4 & 4.2 Amp rated solid state contactor
- Load voltage range of 48–510 VAC, 3-Phase
- LED input status indicator
- AC or DC control
- cUL recognized, CE, RoHS compliant, IEC & HP rated
- Built in overvoltage protection

SOLICON DRC3 Solid State Contactors

All the models of Solicon DRC3 Series combine the benefits and advantages of a solid state contactor with the functionality and simplicity of use of an electromechanical contactor thanks to the proprietary thermal management technology (patented) and complete electrical insulation (no grounding required).

Features & Benefits

- 7.6 amp AC semiconductor motor controller
- Load voltage range up to 600 VAC
- LED input status indicator
- AC or DC control
- C-UL-US listed, IEC rated, CE & RoHS compliant
- Built-in overvoltage protection

DRA1 SPF AC Output Solid State Relay

These relays ensure precision, reliability and quiet operation making them an ideal choice for temperature, lighting and motion control in a variety of medical equipment such as small pumps and warmers for blood transfusion equipment, incubators, electric hospital beds, dialysis machines, warming blankets, sterilizers and ovens.

Features & Benefits

- 10mm single channel DIN rail mount SSR assembly
- AC ratings up to 380 VAC and 10 Amps
- 3–15 VDC, 15–32VDC, 18–36 VAC and 90–140 VAC control
- Cage style screw terminals for easy connection
- Includes LED status indicator (DC control only)

Flex Power Modules

DC/DC power solutions for data communication Infrastructure

Flex Power Modules has a long and successful track record in DC/DC power solutions. In digital power, we are one of the leading players driven by innovation, technical know-how and open standard software.

Applications

- Cloud applications
- Data center application
- Network security
- AI
- IoT
- Big data

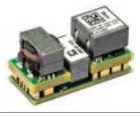
One of our main business areas is datacom applications, which typically run on a 40–60 Vin supply voltage.

Flex Power Modules offers multiple solutions to populate on customers' boards from 48/54 V input down to the voltages needed by the processors, ASICs, FPGAs, memories and other chipsets through various power architectures including IBC + digital POLs, IBC + VRMs, direct conversion, switched capacitor + digital POLs, switched capacitor + VRMs.

Key selling factors include extremely high levels of power integration, increased system level efficiencies, improved board level space savings, low profile solutions, and supported software design capabilities thanks to the Flex Power Designer tool.

Features & Benefits

- Digital DC/DC IBC converters (48V to IBC voltage)
- Direct conversion devices (48V to load voltage)
- Digital point of loads (PoL)
- Switched capacitor IBC (intermediate bus converter)
- Multi-phase voltage regulation modules (VRMs) – high density up to 8-phase for high current loads

Product		Series	V_{in}	V_{out}	P_{out}	I_{out}	Efficiency	Foot print
	Digital DC/DC	BMR480	45–60V	12V	1300W	108.3A	97%	Quarter brick
		BMR491* (HRR)	40–60V	12V	1540W (2450W peak)	205A	97.5%	Quarter brick
	Digital PoL	BMR469	7.5–14V	0.6–5V	–	2 x 25A/ 2 x 40A	Up to 94%	SMD
		BMR461	4.5–14V	0.6–5V	–	6/12/ 15/18A	96%	LGA
	Direct Conversion	BMR481	40–60V	1V	70W	70A	91.6%	27.7 x 12.7 x 16.8mm
	Switched Capacitor	BMR310*	40–60V	10–15V	875W	–	>98 %	58.4 x 25 x 10.3mm
	Multi-phase VRM	BMR510*	4.5–16V	0.5–1.5V	–	480A peak	>88%	10.35 x 37.5 x 10.9mm

*Soon to be released

Flex Power Modules

DC/DC power solutions for 5G/RFPA and microwave

Flex Power Modules has a large product portfolio for Radio Frequency Power Amplifier (RFPA), microwave and small cell applications.

Applications

- LTE/5G RRH/RRU/RU
- Small cell
- Massive MIMO
- PTP/PTMP microwave
- In-building wireless

Our products come in industry standard form factors from 1/16 brick up to 1/2 brick size, delivering from 60W up to 1300W per module.

They are particularly designed for the 5G rollout which is accelerating the world over. Flex Power Modules offers a complete set of solutions to address radio frequency power amplifiers using LDMOS or GAN technology.

The latest products integrate a digital interface to monitor, control and configure the modules using PMBus®.

Our recently launched PKU-A family offers excellent performance in a cost optimized package to support high volume small cell solutions.

Features & Benefits

- High efficiencies of more than 95%
- High reliability with MTBF (mean time between failures) of up to 17.5 Mhrs
- Power levels of up to 1300W
- Typical input voltage range 36–75V

Product	Series	V_{in}	V_{out}	P_{out}	Efficiency	Foot print
	PKU4717YA	36–60V	4.5V	72W	94%	Sixteenth brick
	PKU4116C	36–75V	30V	100W	92.9%	Sixteenth brick
	PKB4216C	36–75V	24/28/30V	Up to 250W	95%	Eighth brick
	PKB4216HD	36–60V	48/50V			
	PKM-D	36–75V	28/30/48/50V	504W	96.2%	Quarter brick
	PKJ4000	36–75V	28/30/48/50V	700W	96.2%	Half brick
	BMR683	36–60V	28V	500W	95.2%	Quarter brick
	BMR685*	36–75V	50V	1300W	96.5%	Half brick

*Soon to be released

TE Connectivity's Axicom Relays

AUTHORIZED DISTRIBUTOR

High frequency relays for up to 6 Ghz Applications

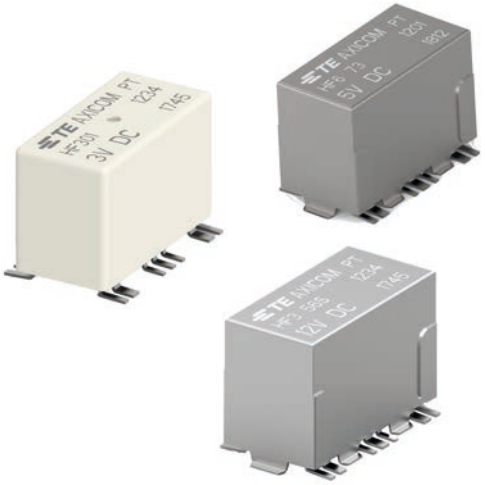
TE's Axicom high frequency relays provide a reliable solution for switching radio frequency applications up to DC 6 Ghz by achieving very low insertion loss, very low return loss and very high isolation. HF relays are available as shielded or none shielded versions with 1 form C switching configuration at 50 or 75 Ωs.

Applications

- Antenna switching devices
- Power amplifiers
- Hi-speed test systems
- Satellite/audio/video tuners
- Wireless base stations
- Cable modems
- Automated test equipment
- Oscilloscope input selection
- High speed routers

Features & Benefits

- Frequency range DC up to 6 GHz.
- Ideal for 5G relay switching applications
- Shielded options for higher performance
- No load carry & hot switching capability
- RF power capability of 50 W (150W on request)
- High isolation and a low insertion loss.
- Low coil power consumption (70mW and 140mW)
- Sealed according to IEC 61810, RT III (wash tight)
- Mono-stable and Bistable coils available
- 50 and 75 Ω impedance versions available
- Surge breakdown voltage between contact and coil: 12kV



OMRON

OMRON

Telecommunication and security relays

The mechanical G5V relay series are serving general purpose, where cost efficiency is just as important as characteristics such as high dielectric strength or UL and CSA standard. G3VM-MT MOS FET Relay Module has minimal leakage current with measurement performance equivalent to conventional reed relays.

Applications

- Telecommunication equipment
- Audio-visual products
- Security equipment
- Building automation equipment
- Semiconductor test equipment
- Medical devices

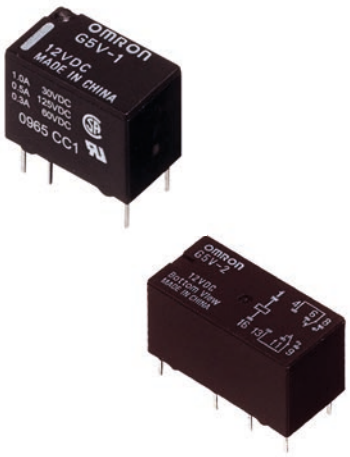
Features & Benefits

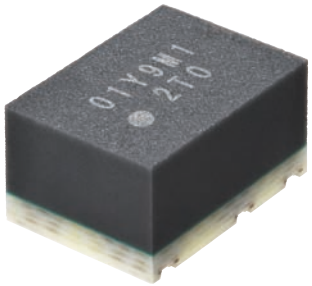
G5V-1: 1CO-CONTACT RELAY

- Ultra-miniature at 12.5×7.5×10mm (L×W×H)
- Wide switching power of 1mA to 1 A
- High sensitivity: 150mW nominal coil power consumption
- Fully-sealed construction offering environment resistance
- Conforms to FCC Part 68 requirements for coil to contacts. (1,500V, 10×160μs)
- Models for ambient temperatures up to 90°C added to series.

G5V-2: 2CO-CONTACT RELAY

- General-purpose DIL terminal layout.
- Wide switching power of 10μA to 2A.
- Fully-sealed type Relays standardized with bifurcated crossbar contacts.
- Conforms to FCC Part 68 requirements for coil to contacts. (1,500 V, 10×160μs)
- High dielectric strength at 1,000 VAC between coil and contacts,
- UL and CSA standard approved.





G3VM-MT

Features & Benefits

- Equipped with a T-switch function to achieve fA-level minimal leakage current
- Contact form: 1a (SPST-NO) + T-switch function
- Contributes to reduction of the mounting space on the printed circuit board with a small package

Panasonic

PhotoMOS® relays for telecommunication equipment

It is a wide variety of signals that are imposed upon telecommunication networks: levels range from millivolts (at microamperes) to tens of volts (at several hundred milliamperes), AC or DC and even high bit-rate signals.

Applications

- Modems
- Network modules
- DCS
- UPS

The switches in communication circuits – which normally carry DC signals – also carry AC signals on top of the DC level when an intermittent signal is being sent. Especially the PhotoMOS® RF series with an optimized and low CxR allows high frequency switching – with a very low output capacitance at open state and a very low on resistance when switched on.

Series	U	I
AQY221N5T	20V	180mA
AQY221*V	25–40V	120–1.000mA

Features & Benefits

- Low CxR
- Linear output characteristics
- No threshold voltage
- Minimum leakage current (pA)
- Extremely long lifetime
- Stable ON-resistance over the entire lifetime
- Extremely compact design (VSSOP, SON, SSOP, SOP, DIP)
- No contact bounce
- Highly resistant to shock and vibration
- Flexible mounting orientation

TE Connectivity's Axicom Relays

AUTHORIZED DISTRIBUTOR

Reliable signal relays for telecom applications

TE's signal relays are one of the smallest electromechanical relays fitting in many continuously shrinking customer applications and are designed for high volume applied technologies. Depending on series, they are available as 1 form A, 2 form A, 1 form C and 2 form C contact versions.

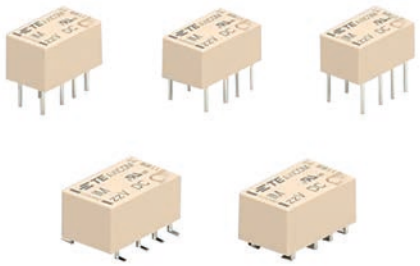
Applications

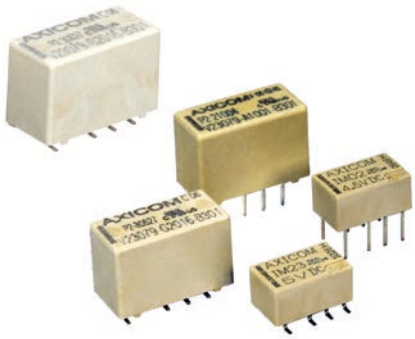
- Automotive infotainment systems (CAN)
- 5G Network systems & infrastructure
- Modems
- Test equipment
- Antenna switching
- Smart thermostats
- Medical solutions
- Keyless entry

IM Relay

Features & Benefits

- Switching current: 2/5A, voltage: 220VDC/250VAC, power: 60W/62.5VA
- Slim line 10x6mm, low profile 5.65mm and min. board-space 60mm2
- Low coil power consumption: 50mW, 100mW and 140mW version available
- High contact reliability up to 10.000.000 operations
- Very low and stable contact resistance
- THT, SMT design for reflow soldering by providing a smaller footprint option
- High mechanical shock resistance up to 50g functional





P2 (V23079) Relay

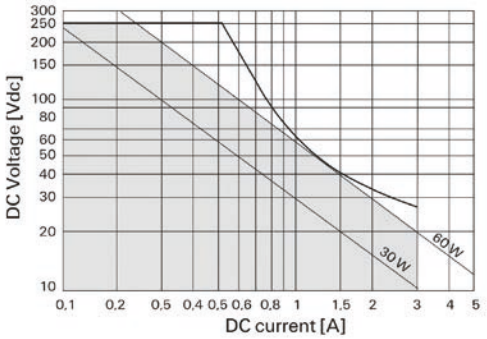
Features & Benefits

- 2 form C bifurcated contacts (2 changeover contacts, 2 CO)
- Switching current: 2/5A, voltage: 220VDC/250VAC, power: 60W/62.5VA
- Standard telecom relay (ringing and test access)
- Slim line 15x7.5mm (.590x.295")
- Immersion cleanable
- Very low coil power dissipation
- High sensitivity for low power consumption 140mW/70mW
- SMD & THT versions available
- 1 coil version meets Telcordia requirement GR-1089 & FCC Part 68

D2N (V23105) Relay

Features & Benefits

- 2 form C contacts (2 CO, 2 changeover contacts)
- Switching current: 3A, voltage: 220VDC/250VAC
- Standard DIL relay, can be mounted onto a DIL socket
- Four different coil sensitivities, 150mW, 200mW, 400mW, >500mW
- Surge voltage resistance meets FCC Part 68 requirement
- Immersion cleanable



Teledyne Relays

TELEDYNE RELAYS Everywhereyoulook™

Surface mount high repeatability SPDT, broadband 18 GHz, 40GBPS non-latching RF relay

The ultraminiature Series GRF131 is designed to provide a practical surface-mount switching solution with RF performance and repeatability to 18GHz.

Applications

- RF attenuators
- RF switch matrices
- High frequency spread spectrum radios
- ATE
- Other applications that require dependable high frequency signal fidelity and performance.

Series GRF131

The GRF131 improves on Teledyne Relays' heritage of miniature RF relays by incorporating a precision transmission line structure in the internal construction of the contact system. GRF131 relays feature a unique ground shield to facilitate surface mounting and to extend the frequency range when compared to through-hole solutions.

Features & Benefits

- High Repeatability
- Wide Bandwidth Performance
- Higher Isolation Between Each Signal Path
- Metal Enclosure for EMI Shielding
- High Isolation Between Control and Signal Paths
- High Resistance to ESD

The unique construction features and manufacturing techniques provide excellent robustness for environmental extremes and overall reliability:

- Minimum mass components and welded construction provide maximum resistance to shock and vibration
- Advanced cleaning techniques provide maximum assurance of internal cleanliness
- Gold-plated precious metal alloy contacts ensure reliable switching
- Hermetic Seal
- RoHS Compliant

The low power consumption makes the GRF131 suitable for applications where power budget is restricted.

Series	Relay type
GRF131	RF Non-Latching, SPDT, Surface Mount Relay

Environmental and physical specifications

Temperature (Ambient)	**Storage:** –55°C to +125°C
	Operating: –55°C to +85°C
Vibration*	10 g's; 10 to 1000 Hz
Shock*	30 g's, 6ms half sine
Spacing Between Adjacent Relays	0.02 in. (Min)
Enclosure	Hermetically sealed
Weight	0.14 oz (4.0 g)

*Relay contacts will exhibit no chatter in excess of 10 µs or transfer in excess of 1 µs.

MEAN WELL

PCB mounted PSU

Perfect fit for appliances – miniature size/high density. Directly mounted onto the PCB these power supplies enable easy connection. Standard industrial and medical ranges available for use in all consumer appliances. Also available are versions compliant to household standard, mandatory for more and more consumer appliances

Applications

- IOT
- EV charging
- Home appliances
- Small electronic devices

IRM Series

Features & Benefits

- 1W–90W Standard Models
- No load power consumption < 0.075W
- Comply with EN55022 class B without any additional components
- Withstand 5G vibration test
- UL62368-1, TÜV EN62368,
- TÜV EN60335-1 household appliance (IRM-03/30/45/60/90 only)
- OVC III:(IRM-30/45/60/90 only)
- Pass LPS

MPM Series (medical)

Features & Benefits

- 5W–90W standard models
- 3.3V–48VDC output
- Wide AC input
- 2 x MOPP medical safety
- Suitable for BF application with appropriate system consideration
- No load power consumption <0.1W
- Extremely low leakage current

Applications

- Portable medical device
- Mobile clinical workstation
- Medical computer monitor
- Medical examination instrument

MEAN WELL

Enclosed power supplies

Modern consumer appliances need to be compliant with the household norm IEC60335. MEAN WELL's LRS range also complies with industrial standard and can be used as a true standard power supply, build it in and focus on functional design.

Applications

- IOT
- Home appliances
- Electronic instruments, equipment or apparatus
- Industrial automation machinery
- EV charging

LRS Series

Features & Benefits

- LRS-35/50/75/100/150
- No load power consumption < 0.2W
- Low profile
- High operating temperature up to 70°C
- UL62368-1, TÜV EN62368
- Compliance to IEC/EN 60335-1(PD3) and IEC/EN61558-1, 2–16 for household appliances
- Operating altitude up to 5000 meters
- Over voltage category III (OVC III)
- Withstand 5G vibration test.
- Cooling by free air convection
- 3 year warranty

MEAN WELL

Indoor LED drivers

MEAN WELL LED drivers for indoor applications span a complete range with suitable models for every lighting application. A special flavor is the KNX compatible LCM series for easy control and access to customer defined light programs.

Applications

- LED indoor lighting
- LED office lighting
- LED architectural lighting
- LED panel lighting

LCM Series

Features & Benefits

- LCM-25/40/60 ENOCEAN/KNX/Casambi/TUYA/Silvair
- AC input range: 180~295V(U type for 110Vac in)
- Class II input, no FG
- Output current level selectable by DIP switch
- Protections: short circuit/OVP/OTP
- Built-in 0~10VDC and PWM dimming function
- Built-in DALI interface and push dimming function (DA-type)
- Built-in 12V/50mA auxiliary output for IOT control.
- Power supplies synchronization function up to 10 units
- Safety certificate:UL8750, ENEC EN61347-2-13, EN62384, CE approved
- Comply with DALI standards: IEC62386-101, 102, 207 (DA-Type)
- 3 year warranty

Murata Power Solutions

PCB mounted PSU

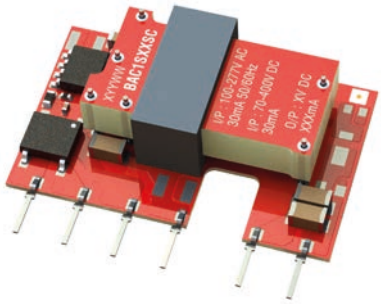
Directly mounted onto the PCB these power supplies enable easy connection. Compliant with both medical and industrial regulations this is an ideal solution for any appliance. SIP model saves board space where DIP model offers increased stability.

Applications

- Air-conditioning
- Tools
- Washing machines
- Blood pressure monitor

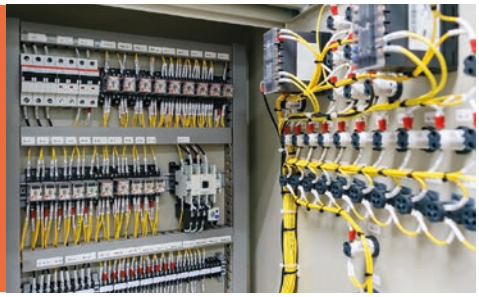
BAC Series

- 1W, 3W, 5W & 10W available
- Medical and also industrial safety
- Wide input range
- Operating -40°C – 85°C
- Convection cooled
- Isolation > 4kV hi pot test
- Low standby power



POL converters 5, 12, 24, 36Vin

Where space is critical these non-isolated point of load converters with wide variety of input ranges are versatile offering reliable and standard of the shelf conversion.



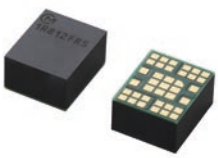
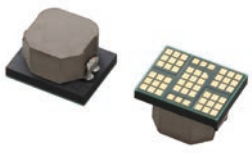
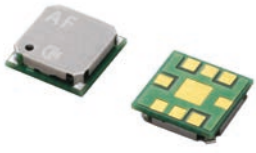
Applications

- Electronic control circuits
- FPGA designs
- Communication circuits

MYM, MYS/MYL Series

Features & Benefits

- 4–30A output current variants
- Open Frame or encapsulated
- Small footprint
- Digital communication
- Compatible with FPGA

MYRGM–WB	MYRGP	MYMGK	MYSGK	MYLSM
				

TE Connectivity's SCHRACK Power Relays

AUTHORIZED DISTRIBUTOR

Appliance power relays

General purpose power relays are among the many components TE provides appliance manufacturers. From a broad range of small countertop appliances to major home appliances and other in-home equipment, TE relays switch heating elements, motors, compressors, lamps and other loads.

Applications

- White goods
- Small appliances like coffee makers
- Power supplies
- Floor care
- Motors
- Compressors
- Heating temperature controllers
- Air conditioning

PCH (5/10A) Relay

Features & Benefits

- 1pole 5A/10A, 1 form C (CO) or 1 form A (NO)
- Sensitive coil 200mW for NO contact versions
- Ambient temperature 85°C
- WG version : Class F coil and product in accordance to IEC60335-1

PB/PBH (10A) Relay

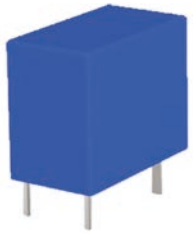
Features & Benefits

- 1pole 10A, 1 form C (CO) or 1 form A (NO)
- Class F coil system standard
- Compact and simple design gives high process security
- WG version: product in accordance to IEC60335-1

OJ-LMH2-WG (8A) Relay

Features & Benefits

- 1-pole 8A, 1NO contact
- Sensitive coil, 200mW
- 3kV or 4kV dielectric strength between coil and contacts
- WG Version in accordance to IEC60335-1



T9G (30A) Relay

Features & Benefits

- 30A switching in NO and 20A in CO
- Meets UL 508 and IEC 61810-1
- 6.3mm load connections via quick connect terminals possible
- 4kV dielectric withstand and 8kV surge voltage
- UL approved for 480 VAC switching

RF (16A) Relay

Features & Benefits

- 1-pole 16A, 1 NO or 1 NC contact
- Coil power 400mW
- Ambient temperature up to 105°C
- Quick connect terminals for load side
- WG version: in accordance to IEC 60335-1

Murata Power Solutions

Picoblock POL converters

Electronic accessories like smartwatches, alarm units for the elderly, VR applications need small light and reliable DC/DC converters to convert the battery voltage to minimize size and weight.

Applications

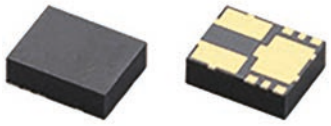
- Smartwatch
- Therapeutic VR application
- Alarm unit for care needing individuals
- Smart key

MYR series

Features & Benefits

- Small size (< 3x3mm)
- Easy development
- Low EMI noise
- Excellent thermal behaviour
- 2.5–18Vin
- 0.8–15Vout
- Output adjustable

2.5mm x 2.0mm x 1.0mm



3.2mm x 2.5mm x 1.0mm

PKG Type	Small Size	High PD	Low EMI	Characteristic
Pocket Coil Type MYRGP series	●	○	●	Low EMI
Multiples Type MYRGP series	○	●	○	High PD Low profile
Cool Post Type MYRGP series	○	●	●	High PD Low EMI

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Contact TTI today to see what a true specialist can offer.

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