

Solid-State Power Relays Selection Guide

Single Phase



Dual Output



AC or DC

Three Phase



Motor Controllers

Quad Output



**TELEDYNE
RELAYS**
Everywhere you look™



RoHS or Non-RoHS:
Your Choice!



Switching Solutions

Teledyne Relays has been providing industrial power solid-state relays for over 40 years. The company offers a broad range of products, from standard off-the-shelf single-, dual-, three- and quad-output relays to custom products with diagnostics and phase monitoring. These relays are used in numerous applications, including food equipment, heating, lighting, medical equipment, motor control, refrigeration, temp control and mil-aero applications. Teledyne's selection of high-quality components results in reduced EMI and lower start-up surges. The rugged design, including the direct-bond copper (DBC) and wirebond assembly, offers the most reliable and thermally efficient product on the market. Teledyne is also the world's innovative leader in manufacturing hermetically sealed solid-state and electromechanical relays. Teledyne Relays' industrial SSRs, mil-aero SSRs, electromechanical relays and coaxial switches offer switching solutions across a wide range of markets and applications.

Markets

- Industrial Power & Motion Control
- Temperature Control
- Lighting
- Motor Control
- Power Supplies
- Medical Equipment
- Commercial & Military Aviation
- Defense & Aerospace
- Telecom/Communications (Wireless)
- Instrumentation & Test

Product Assurance

Under an aggressive Total Quality Management (TQM) program, Teledyne Relays has embraced a "continuous improvement" culture. With recognized certifications such as Boeing D6-82479, MIL-STD-790, AS/EN/JISQ9100:2009 (Rev C) and ISO 9001:2008, Teledyne Relays has become a primary supplier of switching solutions with the highest quality and reliability to industry leaders around the world.

Technical Service & Customer Support

Teledyne Relays provides easy access to technical service and customer support. An innovative, integrated website makes it easy to find technical information, buy relays and even get e-mail responses within 24 hours.



Selection Matrix

 DIN Rail

 Pin-PCB

 Panel/Chassis

| | | CURRENT | | | | | | | | | |
|----|--------------|----------------------|-----------------|----|------|------|------|------|-----|----|-----|
| | | ≤ 125A | | | | | | | | | |
| | | ≤ 95A | | | | | | | | | |
| | | ≤ 75A | | | | | | | | | |
| | | ≤ 50A | | | | | | | | | |
| | | ≤ 35A | | | | | | | | | |
| | | ≤ 25A | | | | | | | | | |
| | | ≤ 12A | | | | | | | | | |
| | | ≤ 9A | | | | | | | | | |
| | | ≤ 4A | | | | | | | | | |
| AC | LINE VOLTAGE | ≤ 30Vac/ Vdc | | | | | | | | | |
| | | 240Vac (≤ 280Vac) | AS4 BS | | STH | STH | STH | STH | SH | SH | SH |
| AC | LINE VOLTAGE | | | | SCH | SSH | SSH | | | | |
| | | | PS | | S | S | | SHP | | | |
| AC | LINE VOLTAGE | | | | ST | ST | | ST | ST | | |
| | | | | | X | X | | SS | SS | | |
| AC | LINE VOLTAGE | | | | | DR | | SF | | | |
| | | | | | | SF | | SD | | | |
| AC | LINE VOLTAGE | | | | FS | FS | | | | | |
| | | | | | DH | L | DH | DH | | | |
| AC | LINE VOLTAGE | | | | DHR | LS | | | | | |
| | | | | | | C3P | | | | | |
| AC | LINE VOLTAGE | | | | | SQ | | | | | |
| | | 480Vac (≤ 520Vac) | AS4 | | G | DR3P | SH | SH | SH | SH | SH |
| AC | LINE VOLTAGE | | | | S3P | | SCH | SCH | SCH | | |
| | | | | | | | SSH | SSH | | | |
| AC | LINE VOLTAGE | | | | | S | | S | S | S | S |
| | | | | | | DR | DR | SS | SS | | |
| AC | LINE VOLTAGE | | | | | DHR | DH | SF | | | |
| | | | | | | | SD | | | | |
| AC | LINE VOLTAGE | | | | | | XV | E3P | E3P | | |
| | | | | | E3PT | | | E3PT | SHP | | SHP |
| AC | LINE VOLTAGE | 600Vac (≤ 690Vac) | AS4 BS | | LS | LS | SH | SH | SH | SH | SH |
| | | | | | | | STH | STH | STH | | |
| AC | LINE VOLTAGE | | | | | | S | S | S | S | |
| | | | | | ST | ST | | SD | X | | |
| AC | LINE VOLTAGE | | | | | | | E3PT | SD | | |
| | | | | | E3P | E3P | | E3P | E3P | | |
| DC | VOLTAGE | ≤ 30Vac/ Vdc | TS | | | | | | | | |
| | | ≤ 36Vdc | SDS TS/PS | PS | LS10 | | | | | | |
| DC | VOLTAGE | ≤ 60Vdc | SDS DX DS | | | | SH10 | | | | |
| | | ≤ 130Vdc | | | | | S20 | SH10 | | | S20 |
| DC | VOLTAGE | ≤ 220Vdc | DX DS | | | | | | | | |
| | | ≤ 350Vdc | | | | SI | SI | S60 | | | SI |

MOTOR CONTROLLERS

| Part No. | Load Current | Control Voltage | Part No. | Max. Motor Power @40°C | | | |
|------------|--------------|-----------------|-------------|------------------------|--------|-----------|--------|
| | | | | Star (Y) | | Delta (D) | |
| | | | | 400Vac | 230Vac | 400Vac | 230Vac |
| EMCRT48D50 | 8.5A | 12-30 Vdc | EMC48S50-02 | 7.5kW | 4.3kW | 13kW | 7.5kW |
| EMCRT48D75 | 16A | 12-30 Vdc | EMC48S50-04 | 15kW | 8.6kW | 26kW | 15kW |

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SINGLE-PHASE AC SOLID-STATE RELAYS

Series SH High Industrial Performance (HIPpak)

AC Solid-State Relays with Covers

Series SH relays offer high performance in a flexible, innovative package. Designed for all types of loads, they provide output to 125A, 690Vac. They incorporate removable touch-proof terminal covers for versatile, easy and quick connections. SH relays feature a metal baseplate and built-in LED. They are up to 30% lighter than standard relays.

- Random and zero-cross models available
- Low zero-cross turn-on voltage
- Input and output protection and control LED
- IP20 touch-proof terminal covers
- Heat sinks available



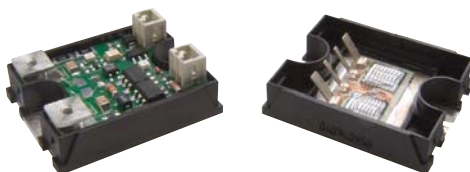
Optional connections

| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|----------|--------------|--------------|--------------|-------------|-----------------|------------------------|--|
| SH24D25 | 25A | 12–275 Vac | 600 Vpeak | Zero Cross | 3–32 Vdc | 600 A ² s | 2.3 x 1.77 x 1.18 in. 58.5 x 45 x 30 mm |
| SH24A25 | 25A | 12–275 Vac | 600 Vpeak | Zero Cross | 20–265 Vac/Vdc | 600 A ² s | |
| SH24D35 | 35A | 12–275 Vac | 600 Vpeak | Zero Cross | 3–32 Vdc | 1250 A ² s | |
| SH24A35 | 35A | 12–275 Vac | 600 Vpeak | Zero Cross | 20–265 Vac/Vdc | 1250 A ² s | |
| SH24D50 | 50A | 12–275 Vac | 600 Vpeak | Zero Cross | 3–32 Vdc | 2500 A ² s | |
| SH24R50 | 50A | 12–275 Vac | 600 Vpeak | Random | 3–32 Vdc | 2500 A ² s | |
| SH24R75 | 75A | 12–275 Vac | 600 Vpeak | Random | 3–32 Vdc | 7200 A ² s | |
| SH24D75 | 75A | 12–275 Vac | 600 Vpeak | Zero Cross | 3–32 Vdc | 7200 A ² s | |
| SH24D95 | 95A | 12–275 Vac | 600 Vpeak | Zero Cross | 3–32 Vdc | 14400 A ² s | |
| SH24D125 | 125A | 12–275 Vac | 600 Vpeak | Zero Cross | 3–32 Vdc | 24000 A ² s | |
| SH48R35 | 35A | 24–510 Vac | 1200 Vpeak | Random | 3.5–32 Vdc | 1250 A ² s | |
| SH48D35 | 35A | 24–510 Vac | 1200 Vpeak | Zero Cross | 3.5–32 Vdc | 1250 A ² s | |
| SH48A35 | 35A | 24–510 Vac | 1200 Vpeak | Zero Cross | 20–265 Vac/Vdc | 1250 A ² s | |
| SH48R50 | 50A | 24–510 Vac | 1200 Vpeak | Random | 3.5–32 Vdc | 2500 A ² s | |
| SH48D50 | 50A | 24–510 Vac | 1200 Vpeak | Zero Cross | 3.5–32 Vdc | 2500 A ² s | |
| SH48A50 | 50A | 24–510 Vac | 1200 Vpeak | Zero Cross | 20–265 Vac/Vdc | 2500 A ² s | |
| SH48R75 | 75A | 24–510 Vac | 1200 Vpeak | Random | 3.5–32 Vdc | 7200 A ² s | |
| SH48D75 | 75A | 24–510 Vac | 1200 Vpeak | Zero Cross | 3.5–32 Vdc | 7200 A ² s | |
| SH48A75 | 75A | 24–510 Vac | 1200 Vpeak | Zero Cross | 20–265 Vac/Vdc | 7200 A ² s | |
| SH48R95 | 95A | 24–510 Vac | 1200 Vpeak | Random | 3.5–32 Vdc | 14400 A ² s | |
| SH48D95 | 95A | 24–510 Vac | 1200 Vpeak | Zero Cross | 3.5–32 Vdc | 14400 A ² s | |
| SH48A95 | 95A | 24–510 Vac | 1200 Vpeak | Zero Cross | 20–265 Vac/Vdc | 14400 A ² s | |
| SH48R125 | 125A | 24–510 Vac | 1200 Vpeak | Random | 3.5–32 Vdc | 24000 A ² s | |
| SH48D125 | 125A | 24–510 Vac | 1200 Vpeak | Zero Cross | 3.5–32 Vdc | 24000 A ² s | |
| SH48A125 | 125A | 24–510 Vac | 1200 Vpeak | Zero Cross | 20–265 Vac/Vdc | 24000 A ² s | |
| SH60D50 | 50A | 24–690 Vac | 1600 Vpeak | Zero Cross | 3.5–32 Vdc | 2500 A ² s | |
| SH60D75 | 75A | 24–690 Vac | 1600 Vpeak | Zero Cross | 3.5–32 Vdc | 7200 A ² s | |
| SH60D95 | 95A | 24–690 Vac | 1600 Vpeak | Zero Cross | 3.5–32 Vdc | 14400 A ² s | |
| SH60D125 | 125A | 24–690 Vac | 1600 Vpeak | Zero Cross | 3.5–32 Vdc | 24000 A ² s | |

See Appendix for heat-sink information and other options.
For RoHS Compliant contact factory.

TELEDYNE'S INNOVATIVE CONSTRUCTION

New construction method offers low profile, less weight, touchproof terminal covers and higher reliability. Teledyne's new HIPpak housing offers a new metallic base for screw terminals versus plastic to improve the ruggedness. The housing also offers hinged, removable terminal covers for opening and closing. Internal components are now surface mount, allowing for a lower profile. The power device continues to utilize a DBC (Direct Bond Copper) process between the copper and alumina substrate. The DBC process offers the most efficient means of transferring thermal energy out of the device. The construction also incorporates wirebonds versus clips and jumpers. This feature reduces the thermal stress improving the reliability of the relay (see chart, page 20).



HIPpak interior

SINGLE-PHASE AC SOLID-STATE RELAYS



Series STH High Industrial Performance (HIPpak) AC Solid-State Relays

Series STH relays offer high performance in a flexible, innovative package. Designed for all types of loads, they deliver output to 75A, 600Vac for resistive loads. They have removable touch-proof terminal covers for versatile, easy and quick connections. STH relays feature a metal baseplate and are up to 30% lighter than standard relays.

- Regulated input current
- Low zero-cross turn-on voltage
- Input protection and control LED standard
- IP20 touch-proof terminal covers optional
- Heat sinks available

| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|----------|--------------|--------------|--------------|-------------|-----------------|-----------------------|--|
| STH24D12 | 12A | 12–280 Vac | 600 Vpeak | Zero Cross | 3–32 Vdc | 128 A ² s | 2.3 x 1.77 x 1.18 in. 58.5 x 45 x 30 mm |
| STH24D25 | 25A | 12–280 Vac | 600 Vpeak | Zero Cross | 3–32 Vdc | 600 A ² s | |
| STH24D35 | 35A | 12–280 Vac | 600 Vpeak | Zero Cross | 3–32 Vdc | 1250 A ² s | |
| STH24D50 | 50A | 12–280 Vac | 600 Vpeak | Zero Cross | 3–32 Vdc | 2500 A ² s | |
| STH48D35 | 35A | 24–600 Vac | 1200 Vpeak | Zero Cross | 3–32 Vdc | 1250 A ² s | |
| STH48D50 | 50A | 24–600 Vac | 1200 Vpeak | Zero Cross | 3–32 Vdc | 2500 A ² s | |
| STH48D75 | 75A | 24–600 Vac | 1200 Vpeak | Zero Cross | 3–32 Vdc | 7200 A ² s | |

See Appendix for heat-sink information and other options.
For RoHS Compliant contact factory.
IP20 touchproof covers option: -17



Series SCH High Industrial Performance (HIPpak) AC Solid-State Relays

Series SCH relays deliver high performance in a flexible, innovative package. Designed for all types of loads, they offer output to 75A, 510Vac. They incorporate removable touch-proof terminal covers and easy connect spring connectors. SCH relays feature a metal baseplate. They are up to 30% lighter than standard relays.

- Low zero-cross turn-on voltage (<12V)
- Input and output protection
- IP20 protection by terminal covers on load terminals
- Regulated input current
- Control status LED

| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|----------|--------------|--------------|--------------|-------------|-----------------|-----------------------|--|
| SCH24D25 | 25A | 12–275 Vac | 600 Vpeak | Zero Cross | 3–32 Vdc | 600 A ² s | 2.3 x 1.77 x 1.18 in. 58.5 x 45 x 30 mm |
| SCH48D35 | 35A | 24–510 Vac | 1200 Vpeak | Zero Cross | 3.5–32 Vdc | 1250 A ² s | |
| SCH48D50 | 50A | 24–510 Vac | 1200 Vpeak | Zero Cross | 3.5–32 Vdc | 2500 A ² s | |

See Appendix for heat-sink information and other options.
For RoHS Compliant contact factory.



Series SSH High Industrial Performance (HIPpak) AC Solid-State Relays

Series SSH relays deliver high performance in a flexible, innovative package. Designed for all types of loads, they offer output to 75A, 510Vac with diagnostics and removable touch-proof terminal covers. SSH relays feature a metal baseplate and are up to 30% lighter than standard relays. SSH Series relays offer system health.

- Built-in diagnostics with status LED
- Low zero-cross turn-on voltage
- Input and output protection and control LED standard
- IP20 protection by terminal covers on load terminals
- Easy connect spring terminals

| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|----------|--------------|--------------|--------------|-------------|-----------------|-----------------------|--|
| SSH24D50 | 50A | 24–265 Vac | 1200 Vpeak | Zero Cross | 7–30 Vdc | 2500 A ² s | 2.3 x 1.77 x 1.18 in. 58.5 x 45 x 30 mm |
| SSH48D75 | 75A | 24–510 Vac | 1200 Vpeak | Zero Cross | 7–30 Vdc | 7200 A ² s | |

See Appendix for heat-sink information and other options.
For RoHS Compliant contact factory.

SINGLE-PHASE AC SOLID-STATE RELAYS



Series S AC Hockey Puck Solid-State Relays

The Series S single-phase relays are designed for all types of loads. The design incorporates an SCR or triac output. The relays utilize optical isolation to protect the control from load transients. All contain an internal snubber for output protection. High-current models are excellent for motor and UPS control.

- Low zero-cross turn-on voltage for low EMI
- AC or DC control available
- Excellent thermal performance
- High immunity to surges
- Internal snubber (except S60 models)

| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|------------|--------------|--------------|--------------|-------------|-----------------|------------------------|---|
| S24R12 | 12A | 12–280 Vrms | 600 Vpeak | Random | 3–30 Vdc | 72 A ² s | 2.29 x 1.75 x 1.06 in. 58.2 x 44.5 x 27 mm |
| S24A12 | 12A | 12–280 Vrms | 600 Vpeak | Zero Cross | 90–240 Vac/Vdc | 72 A ² s | |
| S24D25 | 25A | 12–280 Vrms | 600 Vpeak | Zero Cross | 4–30 Vdc | 288 A ² s | |
| S24A25-22 | 25A | 12–280 Vrms | 600 Vpeak | Zero Cross | 17–80 Vac/Vdc | 288 A ² s | |
| S24R40 | 40A | 12–280 Vrms | 600 Vpeak | Random | 3–30 Vdc | 612 A ² s | |
| S24D40 | 40A | 12–280 Vrms | 600 Vpeak | Zero Cross | 4–30 Vdc | 612 A ² s | |
| S24A40 | 40A | 12–280 Vrms | 600 Vpeak | Zero Cross | 90–240 Vac/Vdc | 612 A ² s | |
| S48R25 | 25A | 24–520 Vrms | 1200 Vpeak | Random | 4–30 Vdc | 265 A ² s | |
| S48D25 | 25A | 24–520 Vrms | 1200 Vpeak | Zero Cross | 5–30 Vdc | 265 A ² s | |
| S48A25-22 | 25A | 24–520 Vrms | 1200 Vpeak | Zero Cross | 17–80 Vac/Vdc | 265 A ² s | |
| S48R50 | 50A | 24–520 Vrms | 1200 Vpeak | Random | 4–30 Vdc | 1500 A ² s | |
| S48D50 | 50A | 24–520 Vrms | 1200 Vpeak | Zero Cross | 5–30 Vdc | 1500 A ² s | |
| S48A50 | 50A | 24–520 Vrms | 1200 Vpeak | Zero Cross | 90–240 Vac/Vdc | 1500 A ² s | |
| S48A50-22 | 50A | 24–520 Vrms | 1200 Vpeak | Zero Cross | 17–80 Vac/Vdc | 1500 A ² s | |
| S48D95 | 95A | 24–520 Vrms | 1200 Vpeak | Zero Cross | 5–30 Vdc | 11000 A ² s | |
| S48R125 | 125A | 24–520 Vrms | 1200 Vpeak | Random | 4–30 Vdc | 20000 A ² s | |
| S48A125 | 125A | 24–520 Vrms | 1200 Vpeak | Zero Cross | 90–240 Vac/Vdc | 20000 A ² s | |
| S48A125-22 | 125A | 24–520 Vrms | 1200 Vpeak | Zero Cross | 17–80 Vac/Vdc | 20000 A ² s | |
| S60D50 | 50A | 24–660 Vrms | 1600 Vpeak | Zero Cross | 7–30 Vdc | 1500 A ² s | |
| S60D75 | 75A | 24–660 Vrms | 1600 Vpeak | Zero Cross | 7–30 Vdc | 5000 A ² s | |
| S60D95 | 95A | 24–660 Vrms | 1600 Vpeak | Zero Cross | 7–30 Vdc | 11000 A ² s | |
| S60D125 | 125A | 24–660 Vrms | 1600 Vpeak | Zero Cross | 7–30 Vdc | 20000 A ² s | |

See Appendix for heat-sink information and other options.
For RoHS Compliant contact factory.



Series SF Slimpak AC Solid-State Relays

Series SF relays are designed for multiple applications, including those where hockey puck style relays need to be mounted onto a PCB. The SF relays are designed with high efficiency Thyristors that offer lower power dissipation, higher surge current rating and lower thermal resistance. All relays offer a control LED for diagnostics.

- Random and zero-cross models available
- Low zero-cross turn-on voltage
- Input protection and control LED standard
- Connectors for power wiring and heatsinks available.

| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|-----------|--------------|--------------|--------------|-------------|-----------------|-----------------------|---|
| SF24D25 | 25A | 12–280 Vrms | 600 Vpeak | Zero Cross | 3–32 Vdc | 600 A ² s | 2.3 x 1.77 x .64 in. 58.5 x 45 x 16.3 mm |
| SF24R50HE | 50A | 12–275 Vrms | 600 Vpeak | Random | 3–32 Vdc | 1680 A ² s | |
| SF60D50HE | 50A | 24–600 Vrms | 1200 Vpeak | Zero Cross | 3.5–32 Vdc | 1680 A ² s | |

For RoHS Compliant contact factory.

SINGLE-PHASE AC SOLID-STATE RELAYS



Series ST AC Hockey Puck Solid-State Relays

Series ST relays are designed for high-power applications. The design incorporates an SCR or triac output. The relays utilize optical isolation to protect the control from load transients. A control LED is available on certain models. All Series ST relays are zero crossing. Internal MOV is also available on ST24D 25A and 50A models.

- Tight zero-cross window for low EMI
- AC or DC control available
- Excellent thermal performance
- Internal MOV (certain models)
- Control LED (certain models)

| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|------------|--------------|--------------|--------------|-------------|-----------------|-----------------------|---|
| ST24D12 | 12A | 12–280 Vrms | 600 Vpeak | Zero Cross | 4–30 Vdc | 72 A ² s | 2.29 x 1.75 x 1.06 in. 58.2 x 44.5 x 27 mm |
| ST24D12-02 | 12A | 12–280 Vrms | 600 Vpeak | Zero Cross | 4–30 Vdc | 72 A ² s | |
| ST24D25 | 25A | 12–280 Vrms | 600 Vpeak | Zero Cross | 4–30 Vdc | 288 A ² s | |
| ST24D25-16 | 25A | 12–280 Vrms | 600 Vpeak | Zero Cross | 4–30 Vdc | 288 A ² s | |
| ST24A25 | 25A | 12–280 Vrms | 600 Vpeak | Zero Cross | 90–240 Vac/Vdc | 288 A ² s | |
| ST24D50 | 50A | 12–280 Vrms | 600 Vpeak | Zero Cross | 4–30 Vdc | 1500 A ² s | |
| ST24D50-16 | 50A | 12–280 Vrms | 600 Vpeak | Zero Cross | 4–30 Vdc | 1500 A ² s | |
| ST24A50 | 50A | 12–280 Vrms | 600 Vpeak | Zero Cross | 90–240 Vac/Vdc | 1500 A ² s | |
| ST24D75 | 75A | 12–280 Vrms | 600 Vpeak | Zero Cross | 4–30 Vdc | 5000 A ² s | |
| ST48D12-02 | 12A | 24–600 Vrms | 1200 Vpeak | Zero Cross | 5–30 Vdc | 72 A ² s | |
| ST48A25-22 | 25A | 24–600 Vrms | 1200 Vpeak | Zero Cross | 17–80 Vac/Vdc | 265 A ² s | |
| ST48D40-02 | 40A | 24–600 Vrms | 1200 Vpeak | Zero Cross | 5–30 Vdc | 612 A ² s | |
| ST48D50-02 | 50A | 24–600 Vrms | 1200 Vpeak | Zero Cross | 5–30 Vdc | 1500 A ² s | |
| ST48D75-02 | 75A | 24–600 Vrms | 1200 Vpeak | Zero Cross | 5–30 Vdc | 5000 A ² s | |

-02 = Control LED; -16 = Internal MOV; -22 = 24 Vac control
See Appendix for heat-sink information and other options.
For RoHS Compliant contact factory.

Series X AC Solid-State Relays

Series X relays are designed in a thin compact plastic package. The X relays offer touch-proof spring terminals for ease of use and user safety. With its medium-power handling capabilities and compact size, the Series X is an excellent choice for medium-power AC loads. Solid-state technology also offers long service life.

- Compact package
- Solid-state relay designed for most loads
- Touch-proof spring-load terminals
- Back-to-back thyristors on output for long life
- Zero-cross turn-on voltage for low EMI

| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|----------|--------------|--------------|--------------|-------------|-----------------|-----------------------|------------------|
| X48D75 | 75A | 24–600 Vrms | 1200 Vpeak | Zero Cross | 5–30 Vac | 5000 A ² s | |
| X60R75 | 75A | 24–690 Vrms | 1600 Vpeak | Random | 4–30 Vac | 5000 A ² s | |

*Terminals limited at 16A
For RoHS Compliant contact factory.



SINGLE-PHASE AC SOLID-STATE RELAYS



Series SS AC Solid-State Relays with Diagnostics

Series SS relays deliver output to 75A, 510Vac with diagnostics.

Designed for all types of loads, the SS is ideal for applications requiring system health / diagnostics. SSH relays feature a metal baseplate for excellent thermal performance. The control LED, status LED, and solid state status output provides electronic and visual fault detection.

- Fault detection: line or load open; short-circuit
- Terminal block for control and status connections
- Control and status LED indicators
- Low zero-cross turn-on voltage
- Solid-state N.C. status output without power supply

| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|----------|--------------|--------------|--------------|-------------|-----------------|-----------------------|---|
| SS24D50 | 50A | 70–280 Vac | 600 Vpeak | Zero Cross | 7–32 Vdc | 1250 A ² s | 2.29 x 1.75 x 1.38 in. 58.2 x 44.5 x 35 mm |
| SS48D50 | 50A | 150–510 Vac | 1200 Vpeak | Zero Cross | 8–32 Vdc | 1250 A ² s | |
| SS48D75 | 75A | 150–510 Vac | 1200 Vpeak | Zero Cross | 8–32 Vdc | 5000 A ² s | |

See Appendix for heat-sink information and other options.
For RoHS Compliant contact factory.



Series DR DIN-Rail AC Solid-State Relays

Series DR DIN-rail relays are designed for all types of loads. The relays utilize optical isolation to protect the control from load transients. DR relays have an integral heat sink, and can be mounted and dismantled onto a DIN rail without tools. The relays may also be panel mounted. All relays offer a green control LED and transient suppression.

- Tool-free DIN-rail mount or direct panel mount
- Zero-cross and random models
- Very high immunity
- Low leakage current
- Internal transient suppression

| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|------------|--------------|--------------|--------------|-------------|-----------------|-----------------------|---|
| DR24A25-22 | 25 Arms | 12–275 Vrms | 600 Vpeak | Zero Cross | 17–60 Vac/Vdc | 312 A ² s | 3.15 x 4.69 x .89 in. 80 x 119.1 x 22.5 mm |
| DR48A25-21 | 30 Arms | 12–480 Vrms | 1200 Vpeak | Zero Cross | 3–32 Vdc | 1500 A ² s | |
| DR48D25 | 25 Arms | 24–510 Vrms | 1200 Vpeak | Zero Cross | 3.5–32 Vdc | 1500 A ² s | |

-21 = Self turn-on suppression; -22 = 17–60 Vac/Vdc
For RoHS Compliant contact factory.



Series FS Miniature AC Solid-State Relays

Series FS relays are designed for medium-power loads. The relays incorporate a triac output and utilize optical isolation to protect the control from load transients. The package is available with faston or PCB terminals. The compact size of the FS makes it ideal for designs where space is limited. The FS has excellent thermal performance.

- Miniature package
- Faston or PCB terminals available
- Tight zero-cross window for low EMI
- Excellent thermal performance
- High immunity to surges

| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|------------|--------------|--------------|--------------|-------------|-----------------|----------------------|---|
| FS24D10-06 | 10A | 12–280 Vrms | 600 Vpeak | Zero Cross | 4–30 Vdc | 72 A ² s | 1.18 x .83 x .59 in. 30 x 21 x 15 mm |
| FS24D10 | 10A | 12–280 Vrms | 600 Vpeak | Zero Cross | 4–30 Vdc | 72 A ² s | |
| FS24D20-06 | 20A | 12–280 Vrms | 600 Vpeak | Zero Cross | 4–30 Vdc | 200 A ² s | |

-06 = Faston
RoHS Compliant available with option: /R

SINGLE-PHASE AC SOLID-STATE RELAYS



Series G AC Solid-State Relays

Series G relays are designed for medium-power loads. The design incorporates a thyristor output. Series G relays utilize optical isolation to protect the control from load transients. An internal MOV is also provided to protect against load transient voltages. The compact size makes it ideal for designs where space is limited.

- Miniature size package
- Power and control connections by Faston terminals
- Internal MOV protection
- Excellent thermal performance
- High immunity to surges

| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|-----------|--------------|--------------|--------------|-------------|-----------------|----------------------|--|
| G24R12-06 | 12 Arms | 12–320 Vrms | 520 Vpeak | Random | 3–32 Vdc | 340 A ² s | 2.63 x 1.50 x .87 in. 56.9 x 38 x 22 mm |
| G24D12-06 | 12 Arms | 12–320 Vrms | 520 Vpeak | Zero Cross | 4–32 Vdc | 340 A ² s | |

-06 = Faston

For RoHS Compliant contact factory.



Series XV No Heat Sink AC Hybrid Relays

Series XV relays combine the best of solid-state and electromechanical technology. The relay is designed in a touch-proof hockey-puck package. The XV relay switches current up to 30A without a heat sink. Visual control status is provided as a standard. Elimination of the heat sink conserves space and makes the XV ideal for many applications.

- Industry-standard package
- Requires no heat sink
- Low zero-cross turn-on voltage for low EMI
- Control LED
- High immunity to surges

| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|----------|--------------|--------------|--------------|-------------|-----------------|----------------------|---|
| XV46D30K | 30A | 12–420 Vrms | 800 Vpeak | Zero Cross | 20–30 Vdc | 288 A ² s | 2.41 x 1.75 x 1.77 in. 61.3 x 44.5 x 45 mm |
| XV46D30C | 30A | 12–420 Vrms | 800 Vpeak | Zero Cross | 12 Vdc | 288 A ² s | |

For RoHS Compliant contact factory.



Series SHPXXNXXA



Series SHPXXNXXR

Series SHP Phase-Control AC Solid-State Relays

The Series SHP phase-angle controller provides analog switching. It features an internal microcontroller and overvoltage protection. Choose relays with either removeable input spring connectors or IP20 touch-proof flaps. The relays are designed in conformity with EN60947-4-3 (IEC947-4-3) and EN60950/VDE0805 (Reinforced Insulation).

- Microcontroller inside
- Analog switching
- Overvoltage protection by varistor
- Green LED for input visualization
- Short-circuit protection

| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|------------|--------------|--------------|--------------|-------------|-----------------|-----------------------|---|
| SHP24N50R | 50A | 90–280 Vac | 600 Vpeak | Phase Angle | 4–20 mA | 2500 A ² s | 1.77 x 2.30 x 1.18 in. 45 x 58.5 x 30 mm |
| SHP48N75A | 75A | 200–240 Vac | 1200 Vpeak | Phase Angle | 0–10 V | 7200 A ² s | 1.77 x 2.30 x 1.32 in. 45 x 58.5 x 33.6 mm |
| SHP48N75R | 75A | 200–240 Vac | 1200 Vpeak | Phase Angle | 4–20 mA | 7200 A ² s | 1.77 x 2.30 x 1.18 in. 45 x 58.5 x 30 mm |
| SHP48N125A | 125A | 200–240 Vac | 1200 Vpeak | Phase Angle | 0–10 V | 7200 A ² s | 1.77 x 2.30 x 1.32 in. 45 x 58.5 x 33.6 mm |
| SHP48N125R | 125A | 200–240 Vac | 1200 Vpeak | Phase Angle | 4–20 mA | 7200 A ² s | 1.77 x 2.30 x 1.18 in. 45 x 58.5 x 30 mm |

For RoHS Compliant contact factory.

SINGLE-PHASE AC SOLID-STATE RELAYS



Series L Ultraminiature AC Solid-State Relays

Series L relays are designed to control medium-power AC loads, while occupying minimal board space. The Series L is an excellent choice for a PCB-mount power-switching relay. A thermal pad is available to eliminate thermal grease when mounting it on to a heat sink. The relay's optical isolation protects the control from load transients.

- Ultraminiature package
- Zero-cross turn-on voltage
- Designed for PC board mounting
- Optional thermal pad available
- High immunity to transients

| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|----------|--------------|--------------|--------------|-------------|-----------------|----------------------|---|
| L24D25C | 25 Arms | 24–280 Vrms | 600 Vpeak | Zero Cross | 3.5–15 Vdc | 260 A ² s | 1.37 x 1.12 x .37 in. 35 x 28.3 x 9.4 mm |
| L24D25G | 25 Arms | 24–280 Vrms | 600 Vpeak | Zero Cross | 12.5–32 Vdc | 260 A ² s | |
| L24D40G | 40 Arms | 24–280 Vrms | 600 Vpeak | Zero Cross | 12.5–32 Vdc | 612 A ² s | |

RoHS Compliant



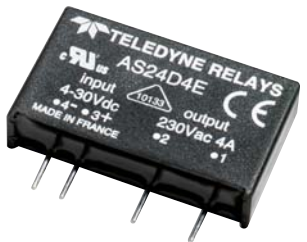
Series LS AC Solid-State Relays with Optional Heat Sinks

Series LS single-inline package (SIP) relays are designed for mounting on printed circuit boards. LS relays facilitate heat sinking by providing an metallic interface surface. The relays use a direct-bonded copper substrate for thermal efficiency, thermal stress performance and long-life expectancy. Optional heat sinks are available.

- Compact SIP package
- Designed for external heat-sink attachment
- Over-sized thyristor ratings (up to 50A)
- Direct-copper bonding technology
- Optional heat sinks available

| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|--------------|--------------|--------------|--------------|-------------|-----------------|-----------------------|--|
| LS24D16C | 16A | 12–280 Vrms | 600 Vpeak | Zero Cross | 4–14 Vdc | 128 A ² s | LS: 1.72 x .96 x .25 in. 43.6 x 24.5 x 6.3 mm |
| LS24D16C-HS1 | 16A | 12–280 Vrms | 600 Vpeak | Zero Cross | 4–14 Vdc | 128 A ² s | |
| LS60D22C | 22A | 24–600 Vrms | 1200 Vpeak | Zero Cross | 4–14 Vdc | 450 A ² s | LS with H1 Heat Sink: 1.72 x 1.4 x .87 in. 43.6 x 35.7 x 22 mm |
| LS60D22C-HS1 | 22A | 24–600 Vrms | 1200 Vpeak | Zero Cross | 4–14 Vdc | 450 A ² s | |
| LS24D27C | 27A | 12–280 Vrms | 600 Vpeak | Zero Cross | 4–14 Vdc | 1800 A ² s | |
| LS60D27C | 27A | 24–600 Vrms | 1200 Vpeak | Zero Cross | 4–14 Vdc | 1800 A ² s | |
| LS60D30C | 30A | 24–600 Vrms | 1200 Vpeak | Zero Cross | 4–14 Vdc | 5000 A ² s | |

-HS1 = With heat sink
RoHS Compliant



Series AS4 Single-Inline Package AC Solid-State Relays

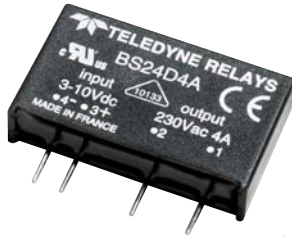
Series AS4 solid-state single inline (SIP) four-pin relays are designed for mounting on a printed circuit board. The relays offer built-in voltage protection and can withstand very high current overloads. The relays have a low zero-cross window. The compact size and triac output make the AS relay the perfect retrofit for electromechanical relays.

- Industry-standard package
- Tight zero-cross window for low EMI
- Low input current draw
- Integral transient voltage protection
- DIN rail available

| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|------------|--------------|--------------|--------------|-------------|-----------------|---------------------|---|
| AS24D4E | 4 Arms | 12–275 Vrms | 600 Vpeak | Zero Cross | 4–30 Vdc | 50 A ² s | 1.70 x 1.0 x .39 in. 43.2 x 25.4 x 10.2 mm |
| AS24D4E-X1 | 4 Arms | 12–275 Vrms | 600 Vpeak | Zero Cross | 4–30 Vdc | 50 A ² s | |
| AS24D4E-X2 | 4 Arms | 12–275 Vrms | 600 Vpeak | Zero Cross | 4–30 Vdc | 50 A ² s | |
| AS46D4E | 4 Arms | 12–460 Vrms | 900 Vpeak | Zero Cross | 4–30 Vdc | 50 A ² s | |
| AS46R4F-02 | 4 Arms | 12–460 Vrms | 900 Vpeak | Random | 7–30 Vdc | 50 A ² s | |

-02 = LED; X1 = DIN rail clip with LED; X2 = DIN rail clip without LED
RoHS Compliant

SINGLE-PHASE AC SOLID-STATE RELAYS



Series BS Single-Inline Package AC Solid-State Relays

Series BS 4-amp solid-state single inline (SIP) four-pin relays are designed for mounting on a printed circuit board. BS relays can withstand very high current overloads. The compact size and triac output make the BS relay an excellent choice for switching medium-power resistive loads.

- Industry-standard package
- High in-rush capabilities
- Low input current draw
- Low zero-cross turn-on voltage for low EMI
- Up to 600Vrms load voltage

| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|----------|--------------|--------------|--------------|-------------|-----------------|---------------------|---|
| BS24D4A | 4 Arms | 15–280 Vrms | 600 Vpeak | Zero Cross | 3–10 Vdc | 50 A ² s | 1.70 x 1.0 x .39 in. 43.2 x 25.4 x 10.2 mm |
| BS24D4F | 4 Arms | 15–280 Vrms | 600 Vpeak | Zero Cross | 8–30 Vdc | 50 A ² s | |
| BS60D4A | 4 Arms | 24–600 Vrms | 1200 Vpeak | Zero Cross | 3.7–10 Vdc | 72 A ² s | |

RoHS Compliant available with option: /R

Series DH (slimpac) AC Solid State Relays

Series DH relays are designed for all types of loads. These relays feature our new high efficiency back-to-back thyristors for long lifetime expectancy. The relays utilize optical isolation to protect the control from load transients. All relays offer a green control LED.

- New High Efficiency Back-to-Back Thyristors
- Zero-cross models designed for resistive loads
- Input protection and control LED standard
- IP20 protective cover
- Up to 600Vrms load voltage



| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|------------|--------------|--------------|--------------|-------------|-----------------|-----------------------|--|
| DH24D12 | 12 Arms | 12-280 Vrms | 600 Vpeak | Zero Cross | 3-32 Vdc | 78 A ² s | 3.58 x .89 x 1.65 in. 91 x 22.5 x 42 mm |
| DH24D25 | 25 Arms | 12-280 Vrms | 600 Vpeak | Zero Cross | 3-32 Vdc | 340 A ² s | |
| DH24D25-16 | 25 Arms | 12-275 Vrms | 600 Vpeak | Zero Cross | 3-32 Vdc | 340 A ² s | |
| DH24D35 | 35 Arms | 12-280 Vrms | 600 Vpeak | Zero Cross | 3-32 Vdc | 882 A ² s | |
| DH24D50 | 50 Arms | 12-280 Vrms | 600 Vpeak | Zero Cross | 3-32 Vdc | 1680 A ² s | |
| DH48D35 | 35 Arms | 24-600 Vrms | 1200 Vpeak | Zero Cross | 3.5-32 Vdc | 882 A ² s | |
| DH48D50 | 50 Arms | 24-600 Vrms | 1200 Vpeak | Zero Cross | 3.5-32 Vdc | 1680 A ² s | |

-16 = Built-in output protection

Series DHR (slimpac) AC Solid State Relays

Series DHR relays are designed for all types of loads. These relays have an integral heat sink and can be DIN-rail mounted without tools. The DHR relays also feature our new high efficiency back-to-back thyristors for long lifetime expectancy. The relays utilize optical isolation to protect the control from load transients. All relays offer a green control LED.

- New High Efficiency Back-to-Back Thyristors
- Zero-cross models designed for resistive loads
- Input protection and control LED standard
- IP20 protective cover
- Tool-free DIN-rail mount or direct panel mount



| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|----------|--------------|--------------|--------------|-------------|-----------------|----------------------|---|
| DHR24D12 | 12 Arms | 12-280 Vrms | 600 Vpeak | Zero Cross | 3-32 Vdc | 78 A ² s | 3.58 x .89 x 4.54 in. 91 x 22.5 x 115.5 mm |
| DHR24D23 | 23 Arms | 12-280 Vrms | 600 Vpeak | Zero Cross | 3-32 Vdc | 340 A ² s | |
| DHR48D32 | 32 Arms | 24-600 Vrms | 1200 Vpeak | Zero Cross | 3.5-32 Vdc | 340 A ² s | |

RoHS Compliant available with option: /R

SINGLE-PHASE AC SOLID-STATE RELAYS



Series PS



Series PS AC Solid-State Relays

Series TS and Series PS relays provide AC/DC switching in a compact size. They also provide AC/DC control. These relays can withstand high surge currents. TS and PS relays are pin-to-pin compatible with electromechanical relays and may be used as replacements.

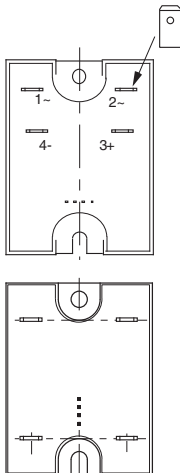
Applications include: vending machines, lighting and fans.

- Compact size
- Pin-to-pin compatible with electromechanical relays
- AC and DC control; AC and DC output
- Random and zero-cross turn-on voltage
- High inrush capabilities

| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|----------|--------------|--------------|--------------|-------------|-----------------|---------------------|--|
| PS24D4G | 4 Arms | 12–275 Vrms | 600 Vpeak | Zero Cross | 12–30 Vac/Vdc | 50 A ² s | 1.14 x .50 x 1 in 29 x 12.7 x 25.4 mm |

RoHS Compliant

DUAL-OUTPUT AC SOLID-STATE RELAYS



Series SD Dual-Output AC Solid-State Relays

Series SD dual-phase relays are designed for all types of loads. The design incorporates two relays in a single package. The relays utilize optical isolation to protect the control from load transients. High-current models are excellent for motor and phase angle control. SD Series are available with faston or screw terminals.

- Designed for all types of loads
- Dual output (two relays in one package)
- Faston or screw terminals
- Tight zero-cross window for low EMI
- High immunity to surges

| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|------------|--------------|--------------|--------------|-------------|-----------------|-----------------------|---|
| SD24D40-06 | 40 Arms | 12–280 Vrms | 600 Vpeak | Zero Cross | 4–30 Vdc | 612 A ² s | 2.28 x 1.75 x 1.26 in. 58 x 44.5 x 32 mm |
| SD24R50-06 | 50 Arms | 12–280 Vrms | 600 Vpeak | Random | 4–30 Vdc | 1500 A ² s | 2.28 x 1.75 x 1.26 in. 58 x 44.5 x 32 mm |
| SD24R50 | 50 Arms | 12–280 Vrms | 600 Vpeak | Random | 4–30 Vdc | 1500 A ² s | 2.28 x 1.75 x 1.06 in. 58 x 44.5 x 27 mm |
| SD24D50-06 | 50 Arms | 12–280 Vrms | 600 Vpeak | Zero Cross | 4–30 Vdc | 1500 A ² s | 2.28 x 1.75 x 1.26 in. 58 x 44.5 x 32 mm |
| SD24R40-06 | 40 Arms | 12–280 Vrms | 600 Vpeak | Random | 4–30 Vdc | 612 A ² s | 2.28 x 1.75 x 1.06 in. 58 x 44.5 x 27 mm |
| SD48D40-06 | 40 Arms | 24–510 Vrms | 1200 Vpeak | Zero Cross | 5–30 Vdc | 612 A ² s | 2.28 x 1.75 x 1.26 in. 58 x 44.5 x 32 mm |
| SD48D50A | 50 Arms | 24–600 Vrms | 1200 Vpeak | Zero Cross | 10–30 Vdc | 1500 A ² s | 2.28 x 1.75 x 1.06 in. 58 x 44.5 x 27 mm |
| SD48D50A2 | 50 Arms | 24–600 Vrms | 1200 Vpeak | Zero Cross | 10–30 Vdc | 1500 A ² s | 2.28 x 1.75 x 1.40 in. 58 x 44.5 x 35.6 mm |

-06 = Faston terminals See Appendix for heat-sink information and other options.
For RoHS Compliant contact factory.

View data sheet for package detail.

THREE-PHASE AC SOLID-STATE RELAYS



Series E3P Three-Phase AC Solid-State Relays

Series E3P three-phase relays are designed for all types of loads. The design incorporates an oversized thyristor output. Control status LED is standard on all models. Output protection is provided internally on certain models. The E3P is available in random and zero-cross turn-on. High-current models are ideal for motor control.

- Three-phase output
- AC or DC control
- Internal output protection
- Tight zero-cross window for low EMI
- High immunity to surges

| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|-------------|--------------|--------------|--------------|-------------|-----------------|-----------------------|--|
| E3P48D75-16 | 75A | 24–520 Vrms | 1200 Vpeak | Zero Cross | 8.5–30 Vdc | 5000 A ² s | 3.94 x 2.89 x 1.56 in. 100 x 73.5 x 39.5 mm |
| E3P48D25 | 25A | 24–600 Vrms | 1200 Vpeak | Zero Cross | 8.5–30 Vdc | 265 A ² s | |
| E3P48D50 | 50A | 24–600 Vrms | 1200 Vpeak | Zero Cross | 8.5–30 Vdc | 1500 A ² s | |
| E3P48A50 | 50A | 24–600 Vrms | 1200 Vpeak | Zero Cross | 90–240 Vac/Vdc | 1500 A ² s | |
| E3P48D75 | 75A | 24–600 Vrms | 1200 Vpeak | Zero Cross | 8.5–30 Vdc | 5000 A ² s | |

-16 = Internal protection
For RoHS Compliant contact factory.



Series E3PT Three-Phase Touch-Proof AC Solid-State Relays

Series E3PT three-phase solid-state relays are designed for all types of loads. The E3PT relays include as a standard a control LED for visual status. The E3PT is touch-proof for user safety. An internal MOV and snubber circuit protect the output thyristor. The E3PT relays are highly immune to large current surges.

- Designed for all types of loads
- Tight zero-cross window for low EMI
- Control LED on all models
- Internal output transient protection
- IP20 touch-proof

| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|------------|--------------|--------------|--------------|-------------|-----------------|-------------------------|--|
| E3PT48D12 | 12A | 24–520 Vrms | 1200 Vpeak | Zero Cross | 8.5–30 Vdc | 72 A ² s | 3.94 x 2.99 x 2.22 in. 100 x 76 x 56.5 mm |
| E3PT48D50 | 50A | 24–520 Vrms | 1200 Vpeak | Zero Cross | 8.5–30 Vdc | 5000 A ² s | |
| E3PT48A50 | 50A | 24–600 Vrms | 1200 Vpeak | Zero Cross | 90–240 Vac | 5000 A ² s | |
| E3PT48D50H | 50A | 24–600 Vrms | 1200 Vpeak | Zero Cross | 8.5–30 Vdc | 20,000 A ² s | |

H = High surge capability
For RoHS Compliant contact factory.



Series DR3P Three-Phase AC Solid-State Relays with Heat Sink and DIN Rail

Series DR3P solid-state relays provide three-phase output, offering both AC and DC control with a zero-cross turn-ON thyristor output. The DR3P provides an integrated heat sink, output transient suppression (MOV and snubber circuit) and LEDs that serve as status indicators for diagnostics. The relays are designed for DIN-rail or panel mounting.

- Three-phase solid-state relay with heat sink
- DIN rail or panel mounting
- AC/DC control voltage with input status LED
- Internal protection by integrated snubber MOV
- IP20 touch-proof

| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|-----------|--------------|--------------|--------------|-------------|------------------------------------|-----------------------|--|
| DR3P48D50 | 22A | 24–520 Vrms | 1200 Vpeak | Zero Cross | 8.5–30 Vdc (DC) 10–30 Vac (AC) | 1500 A ² s | 3.54 x 3.86 x 4.81 in. 89.8 x 98 x 122.2 mm |
| DR3P48A50 | 22A | 24–520 Vrms | 1200 Vpeak | Zero Cross | 90–240 Vdc (DC) 90–240 Vac (AC) | 1500 A ² s | |

For RoHS Compliant contact factory.

THREE-PHASE AC SOLID-STATE RELAYS



Series C3P Three-Phase AC Solid-State Relays

Series C3P relays control medium amounts of power in three-phase applications. Optical isolation ensures complete protection of the C3P's control circuit from load transients. The compact plastic housing provides a low-cost alternative to large metallic three-phase contactors. The ceramic baseplate provides excellent thermal performance.

- Three-phase relay in a compact single-inline package
- High-temperature plastic housing
- Tight zero-cross window for low EMI
- Exposed ceramic baseplate for reduced thermal resistance

| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|------------------|--------------|--------------|--------------|-------------|-----------------|----------------------|-----------------------|
| C3P24D25 | 25 Arms | 24–280 Vrms | 600 Vpeak | Zero Cross | 10–30 Vdc | 260 A ² s | 3.2 x 1.09 x 0.32 in. |
| C3P24D25C | 25 Arms | 24–280 Vrms | 600 Vpeak | Zero Cross | 3.5–10 Vdc | 260 A ² s | 81.9 x 27.7 x 8.3 mm |

Lead forming available upon request.



Series S3P Three-Phase AC Solid-State Relays

Series S3P relays are made up of three separate relays controlled by a common DC voltage control. They are designed to control 10A AC loads such as resistors and small motors on a mains from 12 to 440 Vac, either single- or three-phase. They are well suited for applications requiring compact size and low cost.

- Industry-standard hockey-puck package
- Spring connectors
- Three relays in a single package
- Zero-cross and random turn-on options
- RoHS Compliant available with option -/R

| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|-----------------|--------------|--------------|--------------|-------------|-----------------|---------------------|--|
| S3P44D10 | 10 Arms | 12–440 Vrms | 850 Vpeak | Zero Cross | 4–30 Vdc | 72 A ² s | 2.3 x 1.75 x 1.14 in. 44.5 x 58.5 x 29 mm |

See Appendix for heat-sink information and other options.
RoHS Compliant available with option: /R

QUAD-OUTPUT AC SOLID-STATE RELAYS



Series SQ Quad-Output AC Solid-State Relays

Series SQ relay provides four independent 25A relays in a standard hockey-puck package. The SQ package conserves space while providing high-power switching. The tight zero-cross window reduces the EMI level. Optical isolation ensures complete protection of the control circuit from load transients.

- Four solid-state relays in a hockey puck package
- Tight zero-cross window for low EMI
- Constant current input for low current draw
- High Immunity to surges
- RoHS Compliant available with option -/R

| Part No. | Load Current | Load Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|----------------|--------------|--------------|--------------|-------------|-----------------|----------------------|------------------------|
| SQ24D25 | 25 Arms | 12–280 Vrms | 600 Vpeak | Zero Cross | 3–32 Vdc | 288 A ² s | 2.28 x 1.75 x 1.29 in. |
| SQ24R25 | 25 Arms | 12–280 Vrms | 600 Vpeak | Random | 4–30 Vdc | 288 A ² s | 58 x 44.5 x 33 mm |

See Appendix for heat-sink information and other options.
RoHS Compliant available with option: /R

DC SOLID-STATE RELAYS



Series SH DC Solid-State Relays

Series SH relays offer high performance in a flexible, innovative package. They feature the latest-generation MOSFET technology as well as triggered control input to avoid linear control risks. The relays offer diagnostics, removable touch-proof terminal covers and a metal baseplate. They are up to 30% lighter than standard relays.

- Built-in diagnostics with status LED
- Ultra low on-state resistance
- Low output leakage current
- IP20 protection by terminal covers on load terminals
- No radiated or conducted disturbances

| Part No. | Load Current | Load Voltage | Peak Voltage | Turn-On Time | Control Voltage | ON Resistance | Dimensions LxWxH |
|-------------|--------------|--------------|--------------|--------------|-----------------|---------------|--|
| SH10DC40 | 40A | 5–100 Vdc | 100 Vpeak | 20 µs | 3.5–32 Vdc | 30 mΩ | 2.3 x 1.77 x 1.18 in. 58.5 x 45 x 30 mm |
| SH10DC40-16 | 40A | 5–60 Vdc | 100 Vpeak | 20 µs | 3.5–32 Vdc | 30 mΩ | |
| SH20DC20-16 | 20A | 5–110 Vdc | 200 Vpeak | 20 µs | 3.5–32 Vdc | 90 mΩ | |
| SH20DC40-16 | 40A | 5–110 Vdc | 200 Vpeak | 20 µs | 3.5–32 Vdc | 46 mΩ | |
| SH75DC60-16 | 60A | 5–40 Vdc | 75 Vpeak | 20 µs | 3.5–32 Vdc | 8.2 mΩ | |

-16 = Internal protection

See Appendix for heat-sink information and other options.

For RoHS Compliant contact factory.



Series S20, S60 and S75 DC Solid-State Relays

Series S20 and S60 relays switch medium- to high-power DC loads. These devices feature the latest-generation MOSFET technology as well as an innovative isolated driver to ensure fast power turn on and off. The relays feature triggered control input to avoid linear control risks and fast switching times. The relays also offer an LED for status.

- Low on-state resistance
- Low output leakage current
- Low control current consumption
- Triggered control input to avoid linear control risks
- Low conducted and radiated disturbances

| Part No. | Load Current | Load Voltage | Peak Voltage | Turn-On Time | Control Voltage | ON Resistance | Dimensions LxWxH |
|----------|--------------|--------------|--------------|--------------|-----------------|---------------|--|
| S20DC100 | 100A | 0–130 Vdc | 200 Vpeak | 10 µs | 4.5–32 Vdc | 22 mΩ | 2.29 x 1.75 x 1.1 in. 58.2 x 44.5 x 28 mm |
| S60DC40 | 40A | 0–350 Vdc* | 600 Vpeak | 10 µs | 4.5–32 Vdc | 70 mΩ | |
| S20DC30 | 30A | 0–130 Vdc | 200 Vpeak | 10 µs | 4.5–32 Vdc | 164 mΩ | |
| S75DC150 | 150A | 0–48 Vdc | 75 Vpeak | 10 µs | 4.5–32 Vdc | 2.25 mΩ | |

*275 Vrms size 20 varistor as protection across the output

See Appendix for heat-sink information and other options.

For RoHS Compliant contact factory.



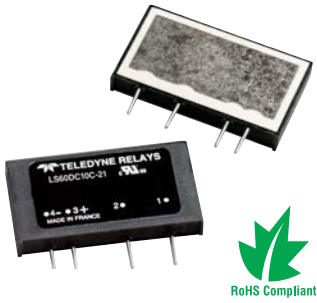
Series SI DC Solid-State Relays

Series SI relays are designed to switch high voltage (high power) DC loads. These devices feature the latest generation of High Voltage IGBT Technology as well as an innovative isolated driver to ensure fast power turn on and OFF. The relays feature triggered control input to avoid linear control risks and fast switching times. The relays also offer an LED for status.

- Latest generation of High Voltage IGBT Technology
- Ultra low output leakage current
- Low control current consumption
- Triggered control input to avoid linear control risks
- Low conducted and radiated disturbances

| Part No. | Load Current | Load Voltage | Peak Voltage | Turn-On Time | Control Voltage | ON Resistance | Dimensions LxWxH |
|-----------|--------------|--------------|--------------|--------------|-----------------|---------------|--|
| SI60DC100 | 100A | 0–500 Vdc | 600 Vpeak | 10 µs | 4.5–32 Vdc | 1.35 V | 2.29 x 1.75 x 1.1 in. 58.2 x 44.5 x 28 mm |
| SI120DC50 | 50A | 0–1000 Vdc | 1200 Vpeak | 10 µs | 4.5–32 Vdc | 1.5 V | |
| SI170DC25 | 25A | 0–1400 Vdc | 1700 Vpeak | 10 µs | 4.5–32 Vdc | 3.3 V | |

See Appendix for heat-sink information and other options.



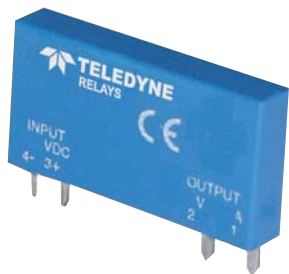
Series LS10 DC Solid-State Relays

Series LS10 DC solid-state relays are designed for mounting on printed circuit boards. They facilitate heatsinking by providing an interface surface. They can switch loads with high starting currents. The nominal switched currents depend on the size of the heat sink. The relays use a direct-bonded copper substrate for thermal efficiency and long life.

- Slim compact design
- Heatsinking capabilities
- Integrated voltage protection
- High surge handling capability
- MOSFET output

| Part No. | Load Current | Load Voltage | Peak Voltage | Turn-On Time | Control Voltage | ON Resistance | Dimensions LxWxH |
|--------------|--------------|--------------|--------------|--------------|-----------------|---------------|--|
| LS60DC10C-21 | 10A | 7–36 Vdc | 60 Vpeak | 20 μ s | 3–10 Vdc | 20 m Ω | 1.71 x 0.96 x 0.25 in. 43.6 x 24.5 x 6.3 mm |
| LS60DC10F-21 | 10A | 7–36 Vdc | 60 Vpeak | 20 μ s | 7–30 Vdc | 20 m Ω | |

-21 = Self turn-on suppression
RoHS Compliant



Series SDS Slim Single-Inline Package DC Solid-State Relays

The Series SDS slim single-inline package (SIP) relays save space on printed circuit boards. Designed for DC applications, they offer a 28Vdc 4A output and a 60Vdc 2.5A output. Several control ranges are available from 3 to 32Vdc. The low-cost plastic relays feature an integrated voltage clamp and high surge handling capability.

- Slim compact DC design
- Range for printed circuit board
- Integrated voltage clamp
- High surge handling capabilities
- Wide control range offerings

| Part No. | Load Current | Load Voltage | Peak Voltage | Turn-On Time | Control Voltage | ON Resistance | Dimensions LxWxH |
|----------|--------------|--------------|--------------|--------------|-----------------|----------------|---|
| SDS32R4A | 4A | 0–32 V | 60 Vpeak | 20 μ s | 3–10 Vdc | 120 m Ω | 1.10 x 0.59 x 0.2 in. 28 x 15 x 5 mm |
| SDS32R4K | 4A | 0–32 V | 60 Vpeak | 20 μ s | 18–32 Vdc | 120 m Ω | |
| SDS60R2C | 2.5A | 0–60 V | 60 Vpeak | 20 μ s | 7–20 Vdc | 200 m Ω | |

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Series DX DIN-Rail DC Solid-State Relays

Series DX relays are designed for DIN-rail mounting. These solid-state relays include a control LED that provides visual control status. Its compact size and user-friendly package make the Series DX relay an excellent choice for designers. The DX series relays offers long life versus mechanical relays.

- Solid-state relays for DIN-rail mounting
- Control visualization by LED
- AC/DC control
- High immunity to surges
- Compact design

| Part No. | Load Current | Load Voltage | Peak Voltage | Turn-On Time | Control Voltage | ON Resistance | Dimensions LxWxH |
|-----------|--------------|--------------|--------------|--------------|-----------------|---------------|---|
| DX6R3E-02 | 3A | 2–60 V | 60 Vpeak | 20 μ s | 3–30 Vdc | 600 Ω | 3.01 x 2.09 x 0.48 in. 76.4 x 53 x 12.2 mm |

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DC SOLID-STATE RELAYS



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Series DS Single-Inline Package DC Solid-State Relays

Series DS single inline package (SIP) four-pin relays are designed for mounting on printed circuit boards. The relays are designed for medium-power DC loads. The Series DS relay is an alternative to electromechanical and reed relays. The DS series relays offers a long life versus mechanical relays.

- Industry-standard package
- Surge tolerant
- Compact size
- Designed for medium-power DC loads
- Solid-state technology offering long life

| Part No. | Load Current | Load Voltage | Peak Voltage | Turn-On Time | Control Voltage | ON Resistance | Dimensions LxWxH |
|----------|--------------|--------------|--------------|--------------|-----------------|---------------|------------------------|
| DS6R3E | 3A | 2–60 V | 60 Vpeak | 200 μ s | 3–30 Vdc | 1000 Ω | 1.70 x 0.98 x 0.39 in. |
| DS22R1E | 1A | 2–220 V | 220 Vpeak | 300 μ s | 3–30 Vdc | 1000 Ω | 43.2 x 25.4 x 10.2 mm |

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Series TS



Series PS



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Series TS and Series PS DC Solid-State Relays

Series TS and Series PS relays provide AC/DC switching in a compact size. They also provide AC/DC control. These relays can withstand high surge currents. TS and PS relays are pin-to-pin compatible with electromechanical relays and may be used as replacements. Applications include vending machines, lighting and fans.

- Compact size
- Pin-to-pin compatible with electromechanical relays
- AC and DC control; AC and DC output
- Random and zero-cross turn-on voltage
- High inrush capabilities

| Part No. | Load Current | Load Voltage | Peak Voltage | Turn-On Time | Control Voltage | ON Resistance | Dimensions LxWxH |
|----------|--------------|--------------|--------------|--------------|-----------------|---------------|---|
| TS3R2G | 2.5A | 0–30 Vdc | 60 Vpeak | 10 ms | 12–30 Vdc | 2100 Ω | 1.14 x .50 x .62 in. 29 x 12.7 x 15.7 mm |
| PS3R5G | 5A | 0–30 V | 60 Vpeak | 50 μ s | 12–30 Vdc | 2100 Ω | 1.14 x .50 x 1 in. 29 x 12.7 x 25.4 mm |

RoHS Compliant

PROTECTION MODULES FOR DC SOLID-STATE RELAYS



Series PR Protection Module

Series PR is a protection module that helps protect DC solid-state relays against voltage transients due to inductive effects of lines and loads. The PR Series offer 2 types, one with additional output protection for DC relays that already have built-in MOV and one with a full protection scheme for relays that have no built-in protection. The PR Series also features IP20 touch-proof covers.

- External protection for DC Solid-State Relays
- Fly wheel diode
- Decoupling capacitor and discharge resistor
- Clamping voltage function
- IP20 touch-proof flaps

| Part No. | Load Current | Load Voltage | Peak Voltage | Recover Time | Vdrop During Fly Wheel | Discharge Time Constant | Dimensions LxWxH |
|----------|--------------|--------------|--------------|--------------|------------------------|-------------------------|-----------------------|
| PR20DC80 | 0–80A | 0–130 Vdc | 200 Vpeak | 190 ns | 1.2 V | 2 s | 2.3 x 1.77 x 1.18 in. |
| PR75DC80 | 0–80A | 0–40 Vdc | 75 Vpeak | 190 ns | 1.2 V | 1 s | 58.5 x 45 x 30 mm |

See Appendix for heat-sink information and other options.

MOTOR CONTROLLERS



Series EMCRT Three-Phase Motor Reverser up to 7.5kW Motors

The Series EMCRT three-phase induction motor reverser can be used to turn on an industrial motor in either direction safely. It is designed to control and invert the direction of a three-phase motor. The reverser incorporates very-high-immunity components and can be mounted on a DIN rail or attached with screws.

- Controls and reverses three-phase motors without direct third leg (two legs)
- IP20 touch-proof housing
- Built-in snubber and MOV
- Forward/Reverse display LED

| Part No. | Motor Current | Mains Voltage | Peak Voltage | Switch Type | Control Voltage | I ² t | Dimensions LxWxH |
|-------------------|---------------|---------------|--------------|-------------|-----------------|-----------------------|------------------------|
| EMCRT48D50 | 8.5A | 24–520 Vac | 1600 Vpeak | Zero Cross | 12–30 Vdc | 1500 A ² s | 3.94 x 2.99 x 2.22 in. |
| EMCRT48D75 | 16A | 24–550 Vac | 1600 Vpeak | Zero Cross | 12–30 Vdc | 5000 A ² s | 100 x 76 56.5 mm |

For RoHS Compliant contact factory.



EMC48S50-02

Series EMC Soft-Start Motor Controller up to 26kW Motors

The Series EMC motor controllers provide an alternative to costly and large variable speed controllers in pumps, fans, compressors and conveyors. Its six-thyristor structure, working like a full-wave phase angle controller, reduces the induction motor starting current as well as the motor starting torque to improve the efficiency of the power used.

- Controls both positive and negative cycles
- Avoids voltage fluctuations that lead to flicker
- Fits existing applications without modification of the wiring field configuration
- Features diagnostic and self-test functions

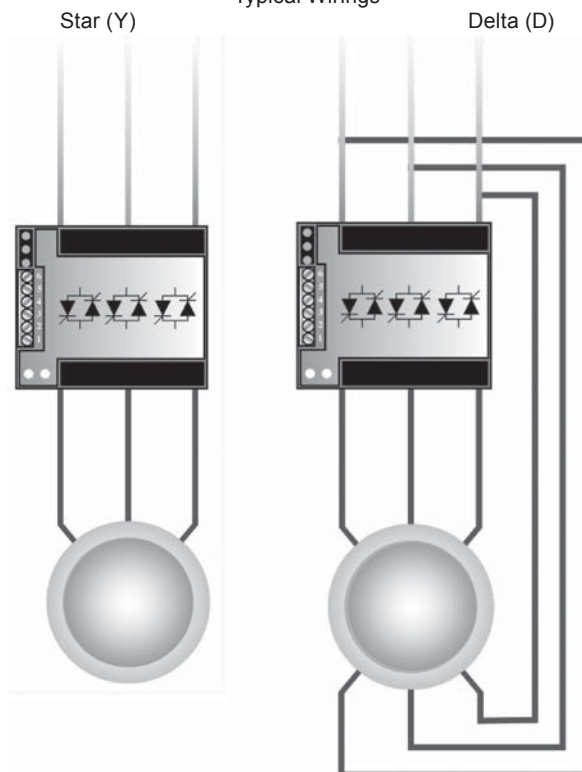
| MAINS CHARACTERISTICS | | | | | | | | | | |
|-----------------------|------------------------|--------|-----------|--------|--------------|-------------|------------------------|-----------------|-------------|-----------------------|
| Part No. | Max. Motor Power @40°C | | | | IAC53a @40°C | | Phase to Phase Voltage | Mains Frequency | Input | Operating Temperature |
| | Star (Y) | | Delta (D) | | Max. | EN60947-4-2 | | | | |
| | 400Vac | 230Vac | 400Vac | 230Vac | | | | | | |
| EMC48S50-02 | 7.5kW | 4.3kW | 13kW | 7.5kW | 16A | 11.5A | 200 to 480Vac | 40 to 65Hz | 10 to 24Vdc | −40°C to +100°C |
| EMC48S50-04 | 15kW | 8.6kW | 26kW | 15kW | 30A | 22.5A | | | | |

For RoHS Compliant contact factory.



EMC48S50-04

Typical Wirings



Hockey Puck Relay Options



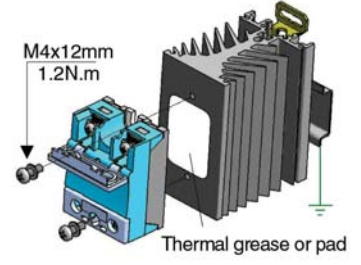
2–2.5°C/W
Teledyne P/N FW151



.1°C/W
Teledyne P/N FW108



0.3°C/W
Teledyne P/N FW031



Thermal grease or pad



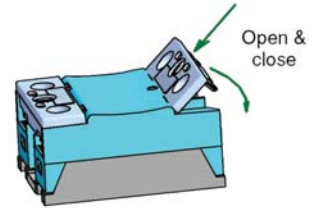
DIN Rail Adapter
Teledyne P/N DL12

Mounting

Most SSRs must be mounted on heat sinks. A large range of heat sinks is available. For heat-sink mounting, use thermal grease or a thermal pad with high conductivity specified by Teledyne. See our website for additional heat sinks.



Thermal Pad
Teledyne P/N –12



Removable IP20 touch-proof
terminal covers on HIPpak

Typical Loads (Random)

HIPpak relays with random turn-on are designed for high inductive loads or phase angle control applications. Our data sheet lists nominal current of power thyristors corresponding to a resistive load (AC-51). Depending on the loads, check the inrush current at turn ON and possible overvoltages at turn OFF.

Main applications:

- AC-55b — Incandescent or infrared lamps. Inrush current is generally 10 times I_n during few 10ms. Random relays often use in-phase angle controllers or soft-starters with the right control.
- AC-53 — Three-phase motors. 2 or 3 random turn-on relays can drive such motors.
- AC-56a — Transformer loads. Very high inrush current up to 100 times I_n . Use a random turn-on SSR like the SH. The table below lists recommended current values for proper lifetime expectancy.

Typical Loads (Zero-Cross)

HIPpak relays with zero-cross turn-on are designed for most types of loads.

Our data sheet lists the AC-51 current value corresponding to resistive loads.

For other loads, check the inrush current at turn ON and possible overvoltages at turn OFF:

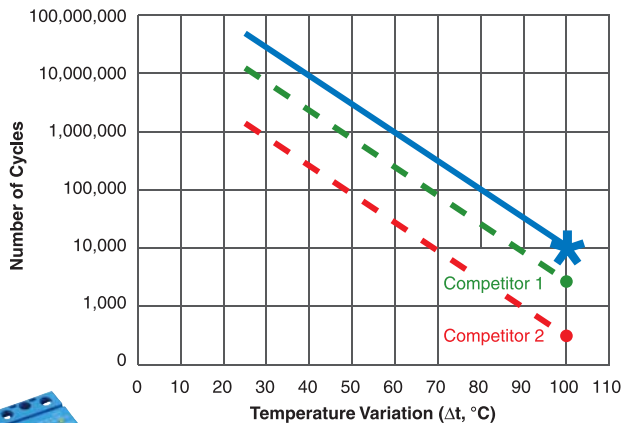
- AC-55b — Incandescent lamps. Inrush current is generally 10 times I_n during few 10ms.
- AC-55a — Electric discharge lamp. These loads often have overcurrent at turn ON and overvoltage at turn OFF, so use 400VAC SSR on 230VAC mains.
- AC-58 — One-pole motors. These loads often have overcurrent at turn ON and overvoltage at turn OFF, so use 400VAC SSR on 230VAC mains and adapt the SSR current to the starting current of the motor.
- AC-53 — Three-phase motors. 2 or 3 SH zero-cross relays can drive these motors, but generally use E3P/E3PT or other three-phase relays or SH random range.
- AC-56a — Transformer loads. Very high inrush current up to 100 times I_n . Use SH random relay or peak control SSR.
- AC-56b — Capacitor loads with very high current at turn ON and overvoltage at turn OFF. Our high-voltage relays are well adapted for high inrush current.

| SSR Model | AC-53 Current (motor) | AC-55b Current (lamp) | AC-55b Current (transformer) | AC-55b Current (capacitor) |
|-----------|--------------------------|--------------------------|---------------------------------|-------------------------------|
| 12A | 2.5A | 2.5A | 0.4A | XXX |
| 25A | 5A | 5A | 1A | XXX |
| 35A | 9A | 9A | 2A | XXX |
| 50A | 12A | 12A | 3A | 13A |
| 75A | 16A | 16A | 6A | 24A |
| 95A | 24A | 24A | 9A | 36A |
| 125A | 32A | 32A | 12A | 48A |

Power Solid-State Relays

Proven - Rugged - Reliable

Reliability / Thermal Cycling Results



* Teledyne HIPpak relay
versus competitive 50A relays

With more than 50 years of proven experience, Teledyne Relays delivers solutions second to none with features like built-in touch-proof covers, built-in heat sinks, miniature solutions, large I^2t values for higher reliability, tight zero-cross window for less noise and lower in-rush currents. Our rugged design offers up to 2000A surge capability and excellent thermal characteristics.

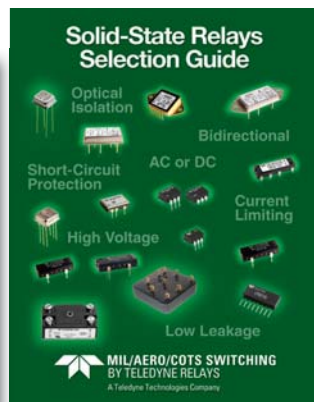
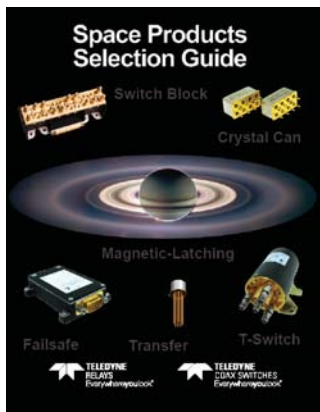


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APPENDIX: NOTES

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APPENDIX: NOTES

[illegible]

APPENDIX: NOTES

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