

**FEATURES/BENEFITS**

- Random and zero-cross models available for all applications
- Low zero-cross turn-on voltage
- Input and output protection and control LED standard
- IP20 touch-proof flaps
- Connectors for power wiring and heat sinks available
- Designed in conformity with EN60947-4-3 (IEC947-4-3) and EN60950/VDE0805 (Reinforced Insulation)



IP20 touch-proof flaps

| Part No. | Load Voltage | Load Current | Control Voltage | Switch Type |
|----------|--------------|--------------|-----------------|-------------|
| SH24D25  | 12-275 Vac   | 25A          | 3-32 Vdc        | Zero Cross  |
| SH24A25  | 12-275 Vac   | 25A          | 20-265 Vac/dc   | Zero Cross  |
| SH24D35  | 12-275 Vac   | 35A          | 3-32 Vdc        | Zero Cross  |
| SH24A35  | 12-275 Vac   | 35A          | 20-265 Vac/dc   | Zero Cross  |
| SH24D50  | 12-275 Vac   | 50A          | 3-32 Vdc        | Zero Cross  |
| SH24R50  | 12-275 Vac   | 50A          | 3-32 Vdc        | Random      |
| SH24R75  | 12-275 Vac   | 75A          | 3-32 Vdc        | Random      |
| SH24D75  | 12-275 Vac   | 75A          | 3-32 Vdc        | Zero Cross  |
| SH24D95  | 12-275 Vac   | 95A          | 3-32 Vdc        | Zero Cross  |
| SH24D125 | 12-275 Vac   | 125A         | 3-32 Vdc        | Zero Cross  |
| SH48R35  | 24-510 Vac   | 35A          | 3.5-32 Vdc      | Random      |
| SH48D35  | 24-510 Vac   | 35A          | 3.5-32 Vdc      | Zero Cross  |
| SH48A35  | 24-510 Vac   | 35A          | 20-265 Vac/dc   | Zero Cross  |
| SH48R50  | 24-510 Vac   | 50A          | 3.5-32 Vdc      | Random      |
| SH48D50  | 24-510 Vac   | 50A          | 3.5-32 Vdc      | Zero Cross  |
| SH48A50  | 24-510 Vac   | 50A          | 20-265 Vac/dc   | Zero Cross  |
| SH48R75  | 24-510 Vac   | 75A          | 3.5-32 Vdc      | Random      |
| SH48D75  | 24-510 Vac   | 75A          | 3.5-32 Vdc      | Zero Cross  |
| SH48A75  | 24-510 Vac   | 75A          | 20-265 Vac/dc   | Zero Cross  |
| SH48R95  | 24-510 Vac   | 95A          | 3.5-32 Vdc      | Random      |
| SH48D95  | 24-510 Vac   | 95A          | 3.5-32 Vdc      | Zero Cross  |
| SH48A95  | 24-510 Vac   | 95A          | 20-265 Vac/dc   | Zero Cross  |
| SH48R125 | 24-510 Vac   | 125A         | 3.5-32 Vdc      | Random      |
| SH48D125 | 24-510 Vac   | 125A         | 3.5-32 Vdc      | Zero Cross  |
| SH48A125 | 24-510 Vac   | 125A         | 20-265 Vac/dc   | Zero Cross  |
| SH60D50  | 24-690 Vac   | 50A          | 3.5-32 Vdc      | Zero Cross  |
| SH60D75  | 24-690 Vac   | 75A          | 3.5-32 Vdc      | Zero Cross  |
| SH60D95  | 24-690 Vac   | 95A          | 3.5-32 Vdc      | Zero Cross  |
| SH60D125 | 24-690 Vac   | 125A         | 3.5-32 Vdc      | Zero Cross  |

**TYPICAL APPLICATION**

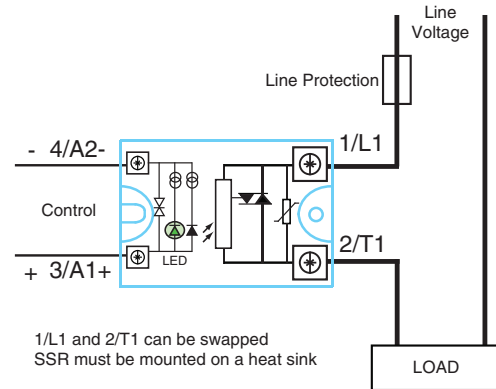


Figure 1a — SHXXDXX relays

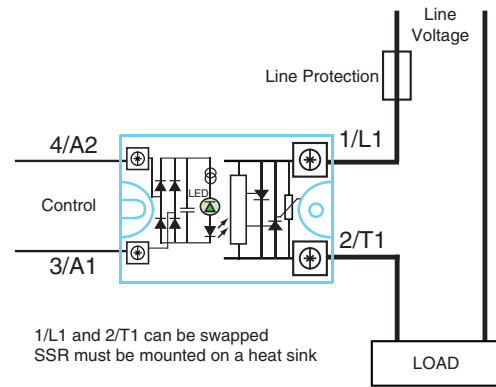


Figure 1b — SHXXAXX relays



Figure 1c — SHXXRXX relays



| ELECTRICAL SPECIFICATIONS<br>(+25°C ambient temperature unless otherwise specified) |                                    |                                     |                   |
|---|------------------------------------|-------------------------------------|-------------------|
| OUTPUT (LOAD) SPECIFICATIONS  |                                    |                                     |                   |
|   | Min                                | Max                                 | Units             |
| <b>Peak Voltage (VDR Clamping)</b>  |                                    |                                     |                   |
| SH24  | (450)                              | 600                                 | V <sub>peak</sub> |
| SH48  | (950)                              | 1200                                | V <sub>peak</sub> |
| SH60  |                                    | 1600                                | V <sub>peak</sub> |
| <b>Load Current Range (Resistive)</b>   |                                    |                                     |                   |
| 25 output current   | .005                               | 25                                  | Arms              |
| 35 output current   | .005                               | 40                                  | Arms              |
| 50 output current   | .005                               | 60                                  | Arms              |
| 75 output current   | .005                               | 90                                  | Arms              |
| 95 output current   | .005                               | 110                                 | Arms              |
| 125 output current  | .005                               | 150                                 | Arms              |
| <b>Maximum Surge Current Rating (Non-Repetitive)</b>                                |                                    |                                     |                   |
| 25 output current   |                                    | 350                                 | A                 |
| 35 output current   |                                    | 500                                 | A                 |
| 50 output current   |                                    | 720                                 | A                 |
| 75 output current   |                                    | 1200                                | A                 |
| 95 output current   |                                    | 1700                                | A                 |
| 125 output current  |                                    | 2200                                | A                 |
| <b>On-State Voltage Drop</b>  |                                    |                                     |                   |
|   |                                    | 0.9                                 | V                 |
| <b>Output Power Dissipation (Max)</b>   |                                    |                                     |                   |
| 25 output current   | 0.9x0.9xI + 0.016xI <sup>2</sup> W |                                     |                   |
| 35 output current   | 0.9x0.9xI + 0.015xI <sup>2</sup> W |                                     |                   |
| 50 output current   | 0.9x0.9xI + 0.012xI <sup>2</sup> W |                                     |                   |
| 75 output current   | 0.9x0.9xI + 0.0045xI <sup>2</sup>  |                                     | W                 |
| 95 output current   | 0.9x0.9xI + 0.0035xI <sup>2</sup>  |                                     | W                 |
| 125 output current  | 0.9x0.9xI + 0.002xI <sup>2</sup> W |                                     |                   |
| <b>Zero-Cross Window (Typical)</b>  |                                    |                                     |                   |
| SHXXR   |                                    | NA                                  |                   |
| SHXXD/A   |                                    | ±12                                 | Vac               |
| <b>Off-State Leakage Current</b>  |                                    |                                     |                   |
| SHXXR   |                                    | 3                                   | mA                |
| SHXXD/A   |                                    | 1                                   | mA                |
| <b>Turn-On Time (60 Hz)</b>   |                                    |                                     |                   |
| SHXXR   |                                    | 0.04                                | ms                |
| SHXXD   |                                    | 8.3                                 | ms                |
| SHXXA   |                                    | 24.9                                | ms                |
| <b>Turn-Off Time (60 Hz)</b>  |                                    |                                     |                   |
| SHXXR/D   |                                    | 8.3                                 | ms                |
| SHXXA   |                                    | 24.9                                | ms                |
| <b>Off-State dv/dt</b>  |                                    |                                     |                   |
|   |                                    | 500                                 | V/μs              |
| <b>Maximum di/dt (Non-Repetitive)</b>   |                                    |                                     |                   |
|   |                                    | 50                                  | A/μs              |
| <b>Operating Frequency</b>  |                                    |                                     |                   |
| SHXXR   | 0.1                                | 400                                 | Hz                |
| SHXXD/A   | 0.1                                | 800                                 | Hz                |
| <b>I<sup>2</sup>t for fuse matching (&lt;10ms)</b>                                  |                                    |                                     |                   |
| 25 output current   |                                    | 600                                 | A <sup>2</sup> s  |
| 35 output current   |                                    | 1250                                | A <sup>2</sup> s  |
| 50 output current   |                                    | 2500                                | A <sup>2</sup> s  |
| 75 output current   |                                    | 7200                                | A <sup>2</sup> s  |
| 95 output current   |                                    | 14400                               | A <sup>2</sup> s  |
| 125 output current  |                                    | 24000                               | A <sup>2</sup> s  |
| <b>Junction-Case Thermal Resistance</b>   |                                    |                                     |                   |
| 25 output current   |                                    | 1.7                                 | °C/W              |
| 35 output current   |                                    | 0.6                                 | °C/W              |
| 50 output current   |                                    | 0.45                                | °C/W              |
| 75 output current   |                                    | 0.4                                 | °C/W              |
| 95 output current   |                                    | 0.3                                 | °C/W              |
| 125 output current  |                                    | 0.25                                | °C/W              |
| <b>Conducted Immunity Level</b>   |                                    |                                     |                   |
| IEC/EN61000-4-4 (bursts)  |                                    |                                     |                   |
| SH24  |                                    | 2kV criterion A                     |                   |
| SH48/SH60   |                                    | 4kV criterion A                     |                   |
| IEC/EN61000-4-5 (surge)   |                                    |                                     |                   |
| SH24  |                                    | 2kV criterion A                     |                   |
| SH48  |                                    | 4kV criterion A                     |                   |
| SH60  |                                    | 4kV criterion A (with external VDR) |                   |



Figure 4a — 25A output current



Figure 4b — 35A output current



Figure 4c — 50A output current



Figure 4d — 75A output current



Figure 4e — 95A output current

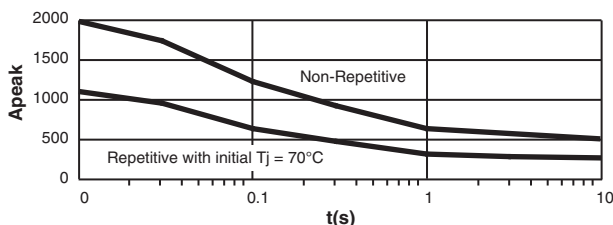


Figure 4f — 125A output current

**GENERAL SPECIFICATIONS**  
(+25°C ambient temperature unless otherwise specified)

**ENVIRONMENTAL SPECIFICATIONS**

|                              | Min | Max | Units |
|------------------------------|-----|-----|-------|
| <b>Operating Temperature</b> |     |     |       |
| Up to 35 output current      | -55 | +80 | °C    |
| Above 35 output current      | -40 | +80 | °C    |

|                            |     |      |    |
|----------------------------|-----|------|----|
| <b>Storage Temperature</b> |     |      |    |
| Up to 35 output current    | -55 | +125 | °C |
| Above 35 output current    | -40 | +125 | °C |

|   |                         |          |      |
|---|-------------------------|----------|------|
| Ambient Humidity                        |                         | 40 to 85 | %    |
| Input-Output Isolation                  | 4000                    |          | Vrms |
| Output-Case Isolation                   | 4000                    |          | Vrms |
| Insulation Resistance<br>@500Vdc        | 1000                    |          | MΩ   |
| Rated Impulse Voltage                   |                         | 4000     | V    |
| Protection Level (CEI529)               |                         | IP20     |      |
| Vibration (10–55 Hz according to CE168) |                         | 1.5      | mm   |
| Shock (according to CD168)              |                         | 30/50    | g    |
| Housing Material                        | PA6 UL94VO              |          |      |
| Baseplate                               | Aluminum, nickel-plated |          |      |

THERMAL CURVES



Figure 5a — 25A output power



Figure 5b — 35A output power

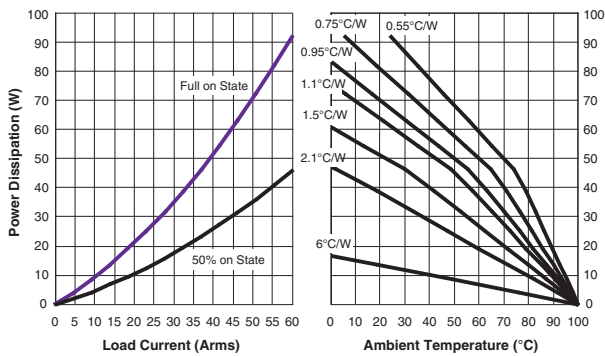


Figure 5c — 50A output power

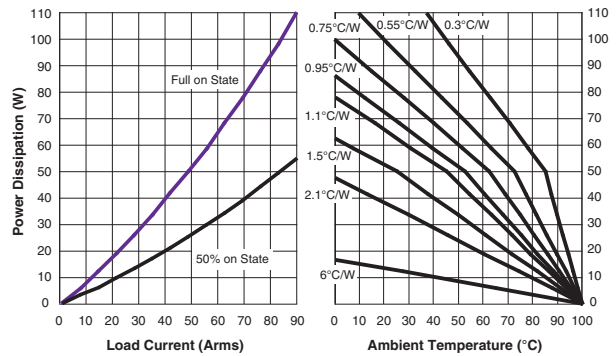


Figure 5d — 75A output power



Figure 5e — 95A output power

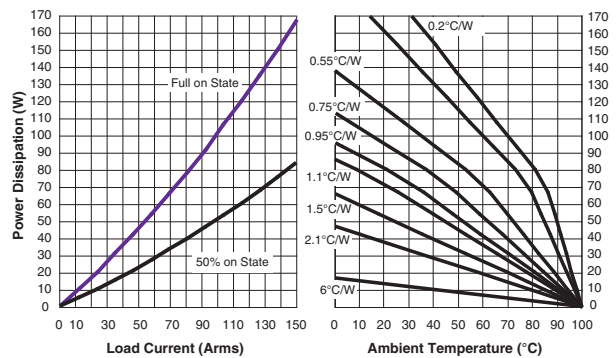


Figure 5f — 125A output power

12°C/W corresponds to a relay without heat sink  
6°C/W corresponds to a relay mounted on a DIN-rail adaptor (Teledyne P/N DL12)

OPTIONAL CONNECTIONS



Directly with wires,  
with or without ferrules



With tips  
(ring terminals)



With special adaptation for  
high-voltage relays

CONTROL WIRING

| Number of Wires   |   |   |   | Screwdriver Type  | Recommended Torque |
|---|---|---|---|---|--------------------|
| 1   |   | 2   |   |   |                    |
| Solid (no ferrule)  | Fine Stranded (with ferrule)  | Solid (no ferrule)  | Fine Stranded (with ferrule)  |  | N.m                |
|  |  |  |  |   |                    |
| AWG18...AWG14   | AWG18...AWG14   | AWG18...AWG14   | AWG18...AWG14   |   |                    |

POWER WIRING

| Number of Wires   |   |   |   | Screwdriver Type  | Recommended Torque |
|---|---|---|---|---|--------------------|
| 1   |   | 2   |   |   |                    |
| Solid (no ferrule)  | Fine Stranded (with ferrule)  | Solid (no ferrule)  | Fine Stranded (with ferrule)  |  | N.m                |
|  |  |  |  |   |                    |
| AWG16...AWG8  | AWG16...AWG10   | AWG16...AWG8  | AWG16...AWG10   |   |                    |

Power with tips



Options

Fastons: Call us



Special kit for high current

AWG2 / 35mm<sup>2</sup>

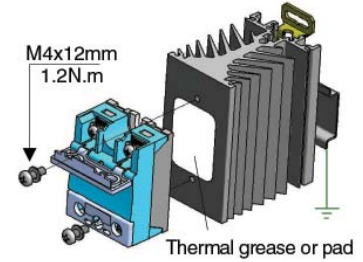


AWG0 / 50mm<sup>2</sup>




 2–2.5°C/W  
Teledyne P/N FW151

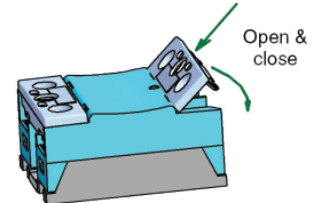
 1.1°C/W  
Teledyne P/N FW108

 0.3°C/W  
Teledyne P/N FW031


Thermal grease or pad


 DIN Rail Adapter  
Teledyne P/N DL12

**Mounting**  
HIPpak 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.


 Thermal Pad  
Teledyne P/N –12


Removable IP20 touch-proof

#### Typical Loads (Random)

SH 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.

| SSR Model | AC-53 Current<br>(motor) | AC-55b Current<br>(lamp) | AC-55b Current<br>(transformer) | AC-55b Current<br>(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                           |

#### Typical Loads (Zero-Cross)

SH 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.

Protection

- To protect the SSR against a short-circuit of the load, use a fuse with a  $I^2t$  value =  $1/2 I^2t$  value specified.

EMC

Immunity:

- Our data sheets list the immunity level of our SSRs according to the main standards for these products: IEC/EN61000-4-4 and IEC/EN61000-4-5. You can compare the high immunity level with other products on the market.

Emission:

- Teledyne SSRs are designed in compliance with standards for class A equipment (Industry).
- Use of this product in domestic environments may cause radio interference. In this case the user may be required to employ additional devices to reduce noise. SSRs are complex devices that must be interconnected with other equipment (loads, cables, etc.) to form a system. Because the other equipment or interconnections may not be under Teledyne's control, it shall be the responsibility of the system integrator to ensure that systems containing SSRs comply with the requirement of any rules and regulations applicable at the system level.
- In phase angle applications, a filter adapted to the load must be necessary.
- The very low zero-cross voltage of SH relays (<12V) improves the conducted emission level in comparison with most other SSRs on the market with zero-cross voltages often higher than 50V.





Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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