

**FEATURES/BENEFITS**

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



With IP20 touch-proof flaps

Without IP20 touch-proof flaps

| Part No. | Load Voltage | Load Current | Control Voltage | Switch Type |
|----------|--------------|--------------|-----------------|-------------|
| STH24D12 | 12-280 Vac   | 12A          | 3-32 Vdc        | Zero Cross  |
| STH24D25 | 12-280 Vac   | 25A          | 3-32 Vdc        | Zero Cross  |
| STH24D35 | 12-280 Vac   | 35A          | 3-32 Vdc        | Zero Cross  |
| STH24D50 | 12-280 Vac   | 50A          | 3-32 Vdc        | Zero Cross  |
| STH48D35 | 24-600 Vac   | 35A          | 3-32 Vdc        | Zero Cross  |
| STH48D50 | 24-600 Vac   | 50A          | 3-32 Vdc        | Zero Cross  |
| STH24D75 | 24-600 Vac   | 75A          | 3-32 Vdc        | Zero Cross  |

**TYPICAL APPLICATION**

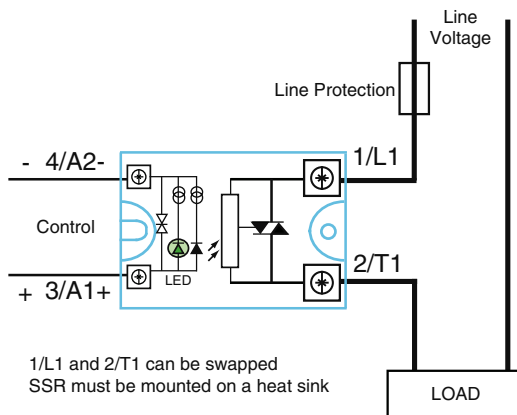


Figure 1a — STH relays, up to 25A

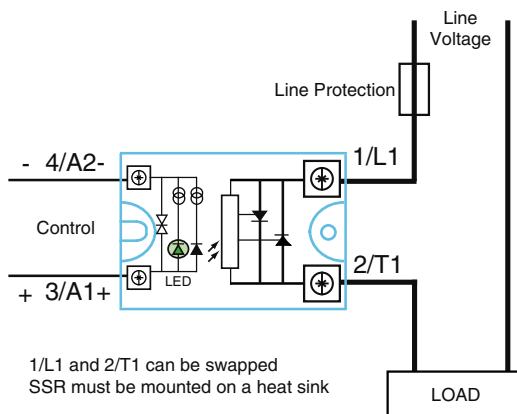
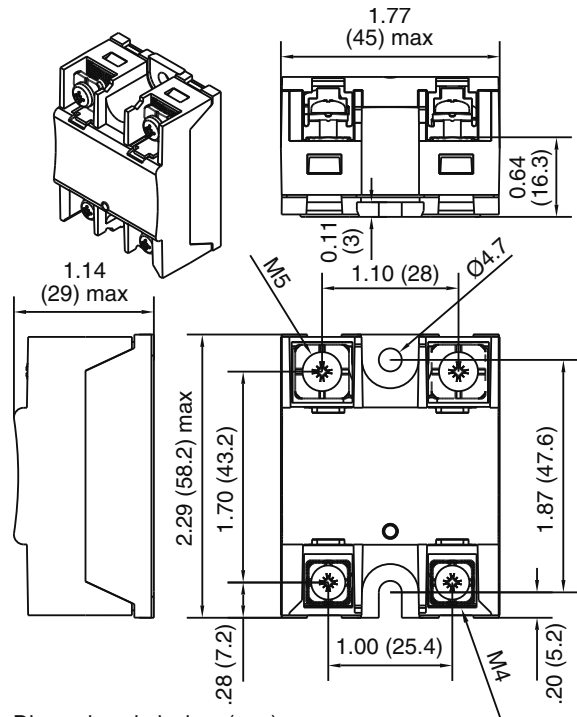


Figure 1b — STH relays, 35A and above

**MECHANICAL SPECIFICATION**



Dimensions in inches (mm)  
Weight: 2.82 oz. (80g)

Figure 2

**CONTROL CHARACTERISTICS**

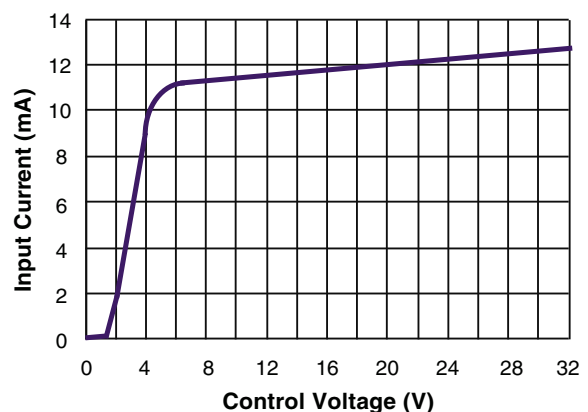


Figure 3 — STH relays

**ELECTRICAL SPECIFICATIONS**

(+25°C ambient temperature unless otherwise specified)

**INPUT (CONTROL) SPECIFICATIONS**

|                                  | Min | Max | Units |
|----------------------------------|-----|-----|-------|
| Input Current Range              | 10  | 13  | mA    |
| Must Turn-Off Voltage            | 2.0 | Vdc |       |
| Reverse Voltage Protection (R/D) |     | 32  | V     |
| Clamping Voltage (R/D)           |     | 36  | V     |
| Input Immunity (EN61000-4-4)     |     | 2   | kV    |
| Input Immunity (EN61000-4-5)     |     | 2   | kV    |

**OUTPUT (LOAD) SPECIFICATIONS**

|              | Min | Max  | Units |
|--------------|-----|------|-------|
| Peak Voltage |     |      |       |
| STH24DXX     |     | 600  | Vpeak |
| STH48DXX     |     | 1200 | Vpeak |

**Load Current Range (Resistive)**

|                   |      |    |      |
|-------------------|------|----|------|
| 12 output current | .005 | 12 | Arms |
| 25 output current | .005 | 25 | Arms |
| 35 output current | .005 | 40 | Arms |
| 50 output current | .005 | 60 | Arms |
| 75 output current | .005 | 90 | Arms |

**Maximum Surge Current Rating (Non-Repetitive)**

|                   |      |   |
|-------------------|------|---|
| 12 output current | 170  | A |
| 25 output current | 350  | A |
| 35 output current | 500  | A |
| 50 output current | 720  | A |
| 75 output current | 1200 | A |

**On-State Voltage Drop**

|                         |      |   |
|-------------------------|------|---|
| Up to 25 output current | 0.85 | V |
| Above 35 output current | 0.9  | V |

**Output Power Dissipation (Max)**

|                   |                                               |   |
|-------------------|-----------------------------------------------|---|
| 12 output current | $0.9 \times 0.85 \times I + 0.042 \times I^2$ | W |
| 25 output current | $0.9 \times 0.85 \times I + 0.016 \times I^2$ | W |
| 35 output current | $0.9 \times 0.9 \times I + 0.015 \times I^2$  | W |
| 50 output current | $0.9 \times 0.9 \times I + 0.012 \times I^2$  | W |
| 75 output current | $0.9 \times 0.9 \times I + 0.0045 \times I^2$ | W |

|                                |     |        |
|--------------------------------|-----|--------|
| Zero-Cross Window (Typical)    | ±35 | Vac    |
| Off-State Leakage Current      | 1   | mA     |
| Turn-On Time (60 Hz)           | 8.3 | ms     |
| Turn-Off Time (60 Hz)          | 8.3 | ms     |
| Off-State dv/dt                | 500 | V/μs   |
| Maximum di/dt (Non-Repetitive) | 50  | A/μs   |
| Operating Frequency            | 0.1 | 800 Hz |

**I<sup>2</sup>t for fuse matching (<10ms)**

|                   |      |                  |
|-------------------|------|------------------|
| 12 output current | 128  | A <sup>2</sup> s |
| 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 |

**Junction-Case Thermal Resistance**

|                   |      |      |
|-------------------|------|------|
| 12 output current | 2.5  | °C/W |
| 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 |

**Conducted Immunity Level**

|                             |                                     |
|-----------------------------|-------------------------------------|
| IEC/EN61000-4-4<br>(bursts) | 2kV criterion B                     |
| IEC/EN61000-4-5<br>(surge)  | 2kV criterion A (with external VDR) |

## 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    |
| STH24D50                     | -40 | +100 | °C    |
| STH48XXX                     | -40 | +80  | °C    |

|                            |     |      |    |
|----------------------------|-----|------|----|
| <b>Storage Temperature</b> |     |      |    |
| Up to 35 output current    | -55 | +125 | °C |
| STH24D50                   | -40 | +100 | °C |
| STH48XXX                   | -40 | +125 | °C |

|                        |          |      |
|------------------------|----------|------|
| Ambient Humidity       | 40 to 85 | %    |
| Input-Output Isolation | 4000     | Vrms |

| Output-Case Isolation   |      |      |
|-------------------------|------|------|
| Up to 25 output current | 2500 | Vrms |
| Above 35 output current | 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 |    |

## SURGE CURRENT

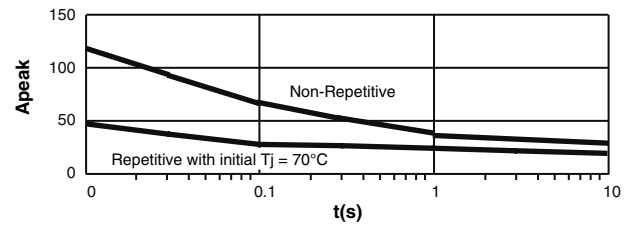


Figure 4a — 12A output current

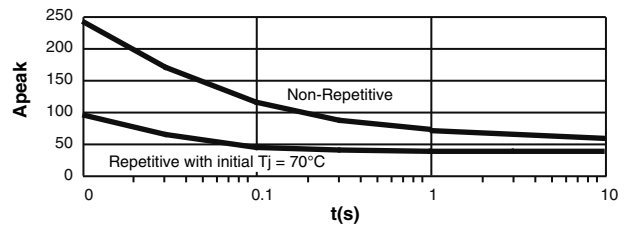


Figure 4b — 25A output current

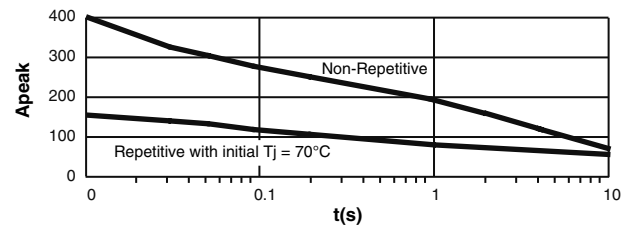


Figure 4c — 35A output current

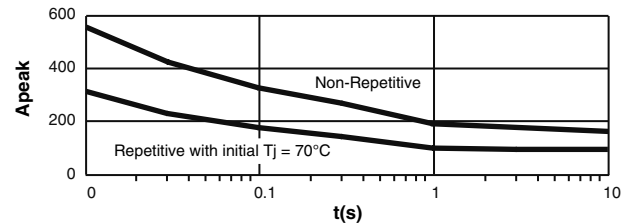


Figure 4d — 50A output current

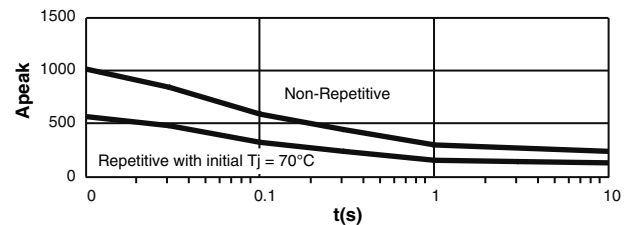


Figure 4e — 75A output current

**THERMAL CURVES**

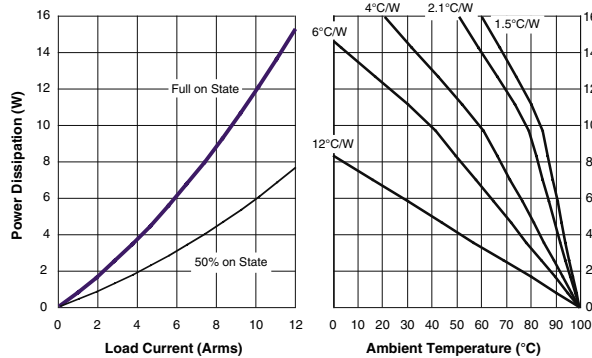


Figure 5a — 12A output power

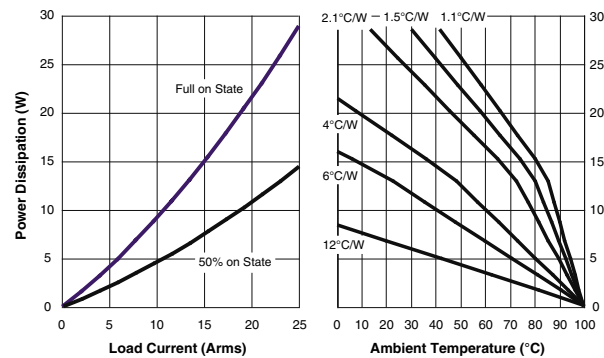


Figure 5b — 25A output power

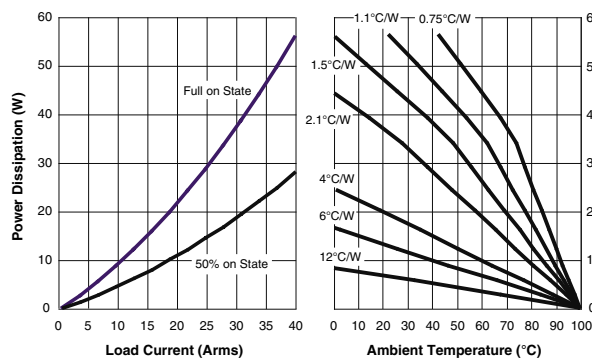


Figure 5c — 35A output power

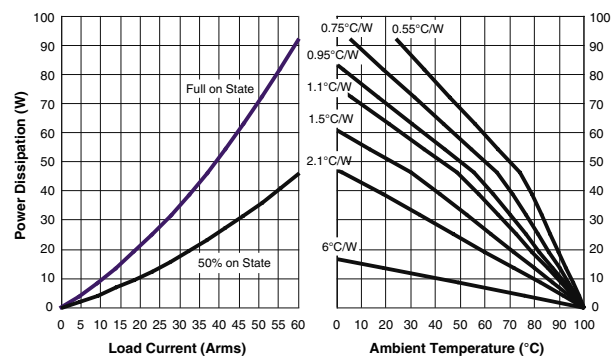


Figure 5d — 50A output power

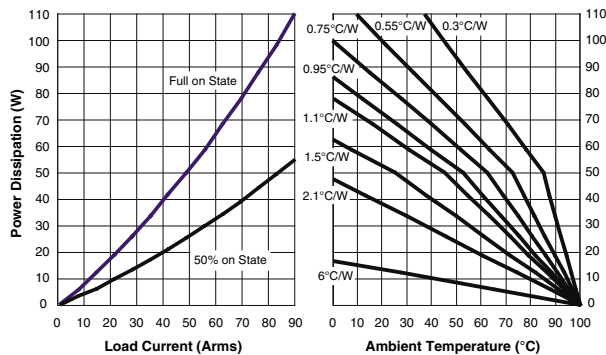


Figure 5e — 75A output power

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)

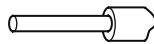
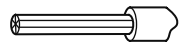
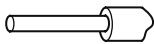
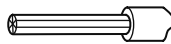
**OPTIONAL CONNECTIONS**


Directly with wires,  
with or without ferrules

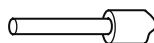
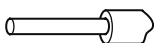


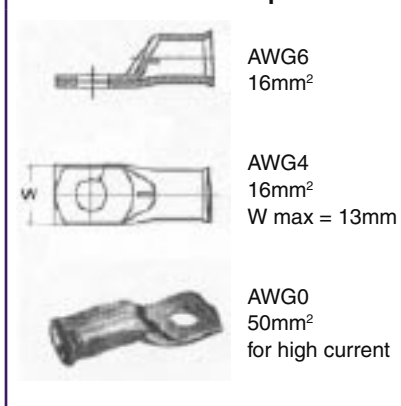
With tips  
(ring terminals)

**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                                                                      | Pozidriv 2                                                                          | 0.8                |

**POWER WIRING**

| Number of Wires                                                                     |                                                                                     |                                                                                     |                                                                                      | Screwdriver<br>Type                                                                   | Recommended<br>Torque |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------|
| 1                                                                                   |                                                                                     | 2                                                                                   |                                                                                      |                                                                                       |                       |
| Solid<br>(no ferrule)                                                               | Fine Stranded<br>(with ferrule)                                                     | Solid<br>(no ferrule)                                                               | Fine Stranded<br>(with ferrule)                                                      |                                                                                       |                       |
|  |  |  |  |  | N.m                   |
| AWG16...AWG8                                                                        | AWG16...AWG10                                                                       | AWG16...AWG8                                                                        | AWG16...AWG10                                                                        | Pozidriv 2                                                                            | 1.2                   |

**Power with tips**

**Options**

- TF100  
Flap reference without mounting
- P/N + -16  
1 flap (on output) + 1 Teledyne mounting
- P/N + -17  
2 flaps (input & output) + 2 Teledyne mounting
- Fastons: Call us
- Connectors for power wiring and heat sinks available
  - Designed in conformity with EN60947-4-3 (IEC947-4-3) and EN60950/VDE0805 (Reinforced Insulation)





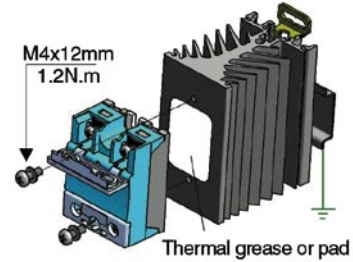
2–2.5°C/W  
Teledyne P/N FW151



1.1°C/W  
Teledyne P/N FW108



0.3°C/W  
Teledyne P/N FW031



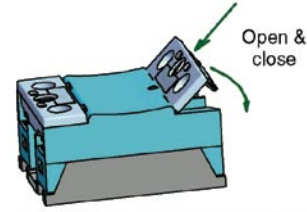
DIN Rail Adapter  
Teledyne P/N DL12

#### 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 flaps

#### Typical Loads

STH relays are designed for AC-51 resistive loads (heating). For other loads, consult our selection guide.

#### 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.

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## Teledyne Relays:

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