

Solid-State Relays

Features

- Rugged, epoxy encapsulation construction
- 4,000 volts of optical isolation
- Subjected to full load test and six times the rated current surge before and after encapsulation
- Unique heat-spreader technology
- UL and CSA recognized*

Overview

In 1974, Opto 22 introduced the first liquid epoxy-filled line of power solid-state relays (SSR). This innovation in SSR design greatly improved the reliability and reduced the cost of manufacturing. At that time, we also incorporated into our manufacturing process 100% testing under full load conditions of every relay we produced.

By 1978, Opto 22 had gained such a reputation for reliability that we were recognized as the world's leading manufacturer of solid-state relays. Through continuous manufacturing improvements and the same 100% testing policy established over 30 years ago, Opto 22 is still recognized today for the very high quality and reliability of all our solid-state relays.

Part Numbers

| Part | Description | Part | Description |
|---------|--------------------------------------------------|-------------------|-------------------------------------------------------------------|
| 120A10 | 120 VAC, 10 Amp, AC Control | 480D10-12 | 480 VAC, 10 Amp, DC Control, Transient Proof |
| 120A25 | 120 VAC, 25 Amp, AC Control | 480D15-12 | 480 VAC, 15 Amp, DC Control, Transient Proof |
| 240A10 | 240 VAC, 10 Amp, AC Control | 480D25-12 | 480 VAC, 25 Amp, DC Control, Transient Proof |
| 240A25 | 240 VAC, 25 Amp, AC Control | 480D45-12 | 480 VAC, 45 Amp, DC Control, Transient Proof |
| 240A45 | 240 VAC, 45 Amp, AC Control | 575D15-12 | 575 VAC, 15 Amp, DC Control, Transient Proof |
| 120D3 | 120 VAC, 3 Amp, DC Control | 575D45-12 | 575 VAC, 45 Amp, DC Control, Transient Proof |
| 120D10 | 120 VAC, 10 Amp, DC Control | 575Di45-12 | 575 VAC, 45 Amp, DC Control, Transient Proof, with LED Indicators |
| 120D25 | 120 VAC, 25 Amp, DC Control | Z120D10 | Z Model, 120 VAC, 10 Amp, DC Control |
| 120D45 | 120 VAC, 45 Amp, DC Control | Z240D10 | Z Model, 240 VAC, 10 Amp, DC Control |
| 240D3 | 240 VAC, 3 Amp, DC Control | MP120D2 or P120D2 | 120 VAC, 2 Amp, DC Control. P model is low profile. |
| 240D10 | 240 VAC, 10 Amp, DC Control | MP120D4 or P120D4 | 120 VAC, 4 Amp, DC Control. P model is low profile. |
| 240Di10 | 240 VAC, 10 Amp, DC Control, with LED Indicators | MP240D2 or P240D2 | 240 VAC, 2 Amp, DC. P model is low profile. |
| 240D25 | 240 VAC, 25 Amp, DC Control | MP240D4 or P240D4 | 240 VAC, 4 Amp, DC. P model is low profile. |
| 240Di25 | 240 VAC, 25 Amp, DC Control, with LED Indicators | MP380D4 | 380 VAC, 4 Amp, DC |
| 240D45 | 240 VAC, 45 Amp, DC Control | | |
| 240Di45 | 240 VAC, 45 Amp, DC Control, with LED Indicators | | |
| 380D25 | 380 VAC, 25 Amp, DC Control | | |
| 380D45 | 380 VAC, 45 Amp, DC Control | | |

*UL recognition is pending for Power Series SSRs with LED indicators. Contact Opto 22 Product Support for current UL information.



Opto 22 Power Series SSR

Description

Opto 22 offers a complete line of SSRs, from the rugged 120/240/380-volt AC Series to the small footprint MP Series, designed for mounting on printed circuit boards. All Opto 22 SSRs feature 4,000 volts of optical isolation and are UL and CSA recognized.* The innovative use of room-temperature liquid epoxy encapsulation, coupled with Opto 22's unique heat-spreader technology, are key to mass producing the world's most reliable solid state relays.

Every Opto 22 solid state relay is subjected to full load test and six times the rated current surge both before and after encapsulation. This double testing of every part before it leaves the factory means you can rely on Opto 22 solid state relays. All Opto 22 SSRs are guaranteed for life.

Power Series SSRs



Opto 22 provides a full range of Power Series relays with a wide variety of voltage (120–575 volts) and current options (3–45 amps). All Power Series relays feature 4,000 volts of optical isolation and have a high PRV rating. Some Power Series relays include built-in LEDs to indicate operation.

DC Series

The DC Series delivers isolated DC control to large OEM customers worldwide.

AC Series

The AC Series offers the ultimate in solid state reliability. All AC Power Series relays feature a built-in snubber and zero voltage turn on. Transient-proof models offer self protection for noisy electrical environments.

Z Series SSRs



The Z Series employs a unique heat transfer system that makes it possible for Opto 22 to deliver a low-cost, 10-amp, solid state relay in an all-plastic case. The push-on, tool-free quick-connect terminals make the Z Series ideal for high-volume OEM applications.

Printed Circuit Series SSRs



Opto 22's Printed Circuit Series allows OEMs to easily deploy solid state relays on printed circuit boards. Two unique packages are available, both of which will switch loads up to four amps.

MP Series

The MP Series packaging is designed with a minimum footprint to allow maximum relay density on the printed circuit board.

P Series

The P Series power relays provide low-profile [0.5 in. (12.7 mm)] center mounting on printed circuit boards.

Solid-State Relays

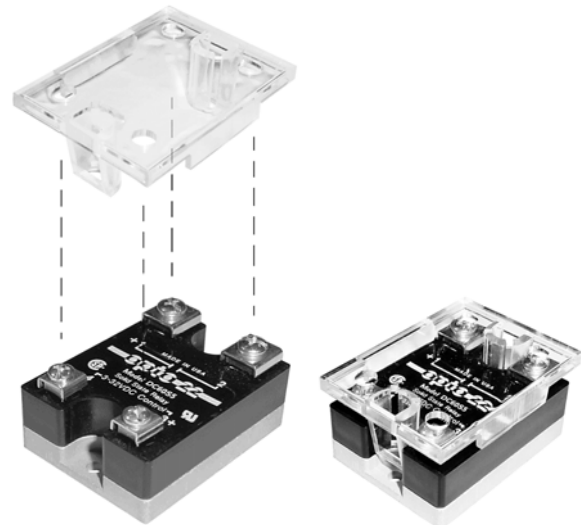
Specifications (all Power Series models)

- 4,000 V optical isolation, input to output
- Zero voltage turn-on
- Turn-on time: 0.5 cycle maximum
- Turn-off time: 0.5 cycle maximum
- Operating frequency: 25 to 65 Hz (operates at 400 Hz with six times off-state leakage)
- Coupling capacitance, input to output: 8 pF maximum
- Hermetically sealed
- DV/DT Off-state: 200 volts per microsecond
- DV/DT commutating: snubbed for rated current at 0.5 power factor
- UL recognized*
- CSA certified
- CE component

See Opto 22 form #986 for torque specifications.

Safety Cover for Power Series SSRs

A plastic safety cover (Opto 22 part number SAFETY COVER) is optionally available for Opto 22 Power Series SSRs. The safety cover reduces the chance of accidental contact with relay terminals, while providing access holes for test instrumentation.



An optional plastic safety cover can be installed on a Power Series SSR.

*UL recognition is pending for Power Series SSRs with LED indicators. Contact Opto 22 Product Support for current UL information.

Solid-State Relays

AC Power Series Specifications

Opto 22 provides a full range of Power Series relays with a wide variety of voltage (120–575) and current options (3–45 amps). All Power Series relays feature 4,000 volts of optical isolation and have a high PRV rating.

120/240/380 Volt

| Model Number | Nominal AC Line Voltage | Nominal Current Rating (Amps) | 1 cycle Surge (Amps) Peak | Nominal Signal Input Resistance (Ohms) | Signal Pick-up Voltage | Signal Drop-out Voltage | Peak Repetitive Voltage Maximum | Maximum Output Voltage Drop | Off-State Leakage (mA) Maximum** | Operating Voltage Range (Volts AC) | $\tau^2 t$ Rating $t=8.3$ (ms) | Isolation Voltage | θ_{jc}^* ($^{\circ}$ C/Watt) | Dissipation (Watts/ Amp) |
|--------------|-------------------------|-------------------------------|---------------------------|----------------------------------------|------------------------|-------------------------|---------------------------------|-----------------------------|----------------------------------|------------------------------------|--------------------------------|-----------------------|--------------------------------------|--------------------------|
| 120D3 | 120 | 3 | 85 | 1000 | 3VDC (32V allowed) | 1 VDC | 600 | 1.6 volts | 2.5mA | 12–140 | 30 | 4,000V _{RMS} | 11 | 1.7 |
| 120D10 | 120 | 10 | 110 | 1000 | 3VDC (32V allowed) | 1 VDC | 600 | 1.6 volts | 7 mA | 12–140 | 50 | 4,000V _{RMS} | 1.3 | 1.6 |
| 120D25 | 120 | 25 | 250 | 1000 | 3VDC (32V allowed) | 1 VDC | 600 | 1.6 volts | 7 mA | 12–140 | 250 | 4,000V _{RMS} | 1.2 | 1.3 |
| 120D45 | 120 | 45 | 650 | 1000 | 3VDC (32V allowed) | 1 VDC | 600 | 1.6 volts | 7 mA | 12–140 | 1750 | 4,000V _{RMS} | 0.67 | 0.9 |
| 240D3 | 240 | 3 | 85 | 1000 | 3VDC (32V allowed) | 1 VDC | 600 | 1.6 volts | 5 mA | 24–280 | 30 | 4,000V _{RMS} | 11 | 1.7 |
| 240D10 | 240 | 10 | 110 | 1000 | 3VDC (32V allowed) | 1 VDC | 600 | 1.6 volts | 14 mA | 24–280 | 50 | 4,000V _{RMS} | 1.3 | 1.6 |
| 240Di10 | 240 | 10 | 110 | 730 | 3VDC (32V allowed) | 1 VDC | 600 | 1.6 volts | 14 mA | 24–280 | 50 | 4,000V _{RMS} | 1.3 | 1.6 |
| 240D25 | 240 | 25 | 250 | 1000 | 3VDC (32V allowed) | 1 VDC | 600 | 1.6 volts | 14 mA | 24–280 | 250 | 4,000V _{RMS} | 1.2 | 1.3 |
| 240Di25 | 240 | 25 | 250 | 730 | 3VDC (32V allowed) | 1 VDC | 600 | 1.6 volts | 14 mA | 24–280 | 250 | 4,000V _{RMS} | 1.2 | 1.3 |
| 240D45 | 240 | 45 | 650 | 1000 | 3VDC (32V allowed) | 1 VDC | 600 | 1.6 volts | 14 mA | 24–280 | 1750 | 4,000V _{RMS} | 0.67 | 0.9 |
| 240Di45 | 240 | 45 | 650 | 730 | 3VDC (32V allowed) | 1 VDC | 600 | 1.6 volts | 14 mA | 24–280 | 1750 | 4,000V _{RMS} | 0.67 | 0.9 |
| 380D25 | 380 | 25 | 250 | 1000 | 3VDC (32V allowed) | 1 VDC | 800 | 1.6 volts | 12 mA | 24–420 | 250 | 4,000V _{RMS} | 1.2 | 1.3 |
| 380D45 | 380 | 45 | 650 | 1000 | 3VDC (32V allowed) | 1 VDC | 800 | 1.6 volts | 12 mA | 24–420 | 1750 | 4,000V _{RMS} | 0.67 | 0.9 |
| 120A10 | 120 | 10 | 110 | 33K | 85VAC (280V allowed) | 10 VAC | 600 | 1.6 volts | 7 mA | 12–140 | 50 | 4,000V _{RMS} | 1.3 | 1.6 |
| 120A25 | 120 | 25 | 250 | 33K | 85VAC (280V allowed) | 10 VAC | 600 | 1.6 volts | 7 mA | 12–140 | 250 | 4,000V _{RMS} | 1.2 | 1.3 |
| 240A10 | 240 | 10 | 110 | 33K | 85VAC (280V allowed) | 10 VAC | 600 | 1.6 volts | 14 mA | 24–280 | 50 | 4,000V _{RMS} | 1.3 | 1.6 |
| 240A25 | 240 | 25 | 250 | 33K | 85VAC (280V allowed) | 10 VAC | 600 | 1.6 volts | 14 mA | 24–280 | 250 | 4,000V _{RMS} | 1.2 | 1.3 |
| 240A45 | 240 | 45 | 650 | 33K | 85VAC (280V allowed) | 10 VAC | 600 | 1.6 volts | 14 mA | 24–280 | 1750 | 4,000V _{RMS} | 0.67 | 0.9 |

Note: θ_{jc}^* = Thermal resistance junction to base. Maximum junction temperature is 110 $^{\circ}$ C.

** Operating Frequency: 25 to 65 Hz (operates at 400 Hz with 6 times the offstate leakage)

Solid-State Relays

AC Power Series Specifications

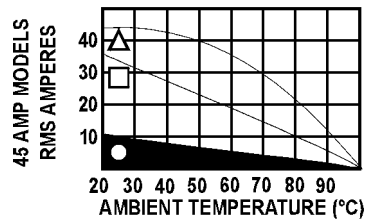
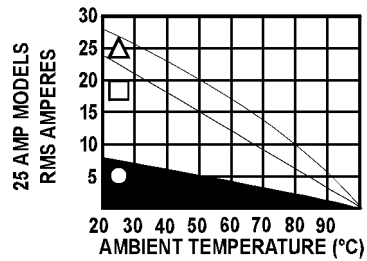
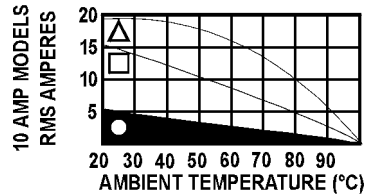
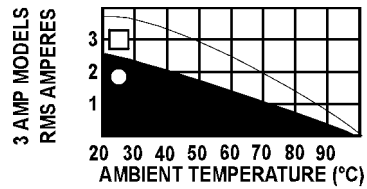
120/240/380 Volt (cont.)

Surge Current Data

| Time (Seconds) | Time* (Cycles) | 3-Amp Peak Amps | 10-Amp Peak Amps | 25-Amp Peak Amps | 45-Amp Peak Amps |
|----------------|----------------|-----------------|------------------|------------------|------------------|
| 0.017 | 1 | 85 | 110 | 250 | 650 |
| 0.050 | 3 | 66 | 85 | 175 | 420 |
| 0.100 | 6 | 53 | 70 | 140 | 320 |
| 0.200 | 12 | 45 | 60 | 112 | 245 |
| 0.500 | 30 | 37 | 50 | 80 | 175 |
| 1 | 60 | 31 | 40 | 67 | 134 |
| 2 | 120 | 28 | 33 | 53 | 119 |
| 3 | 180 | 27 | 32 | 49 | 98 |
| 4 | 240 | 26 | 31 | 47 | 95 |
| 5 | 300 | 25 | 30 | 45 | 91 |
| 10 | 600 | 24 | 28 | 42 | 84 |

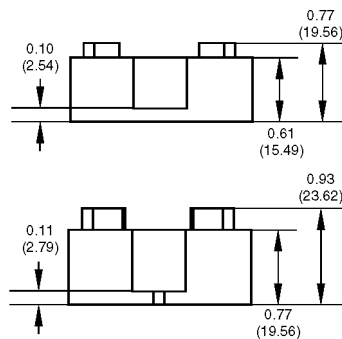
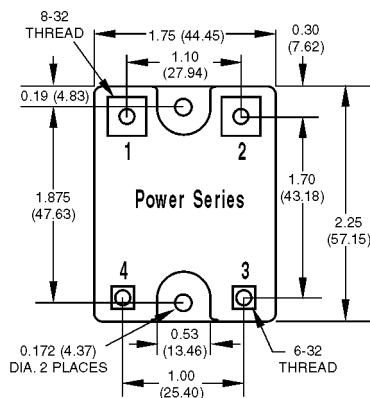
Note: *60 Hz.

Thermal Ratings



- FREE AIR
- MOUNTED ON
6" X 6" PLATE (2°c/watt)
- MOUNTED ON
12" X 12" PLATE (1°c/watt)

Dimensional Drawings



Side view: Part numbers DC60S3, 120D3, and 240D3 only

Side view: All other part numbers