

Section

4 Relays - Solid State



SECTION 4



Solid State Relays – Application Data

Definition: A SSR (solid state relay) can perform many tasks that an EMR (electromechanical relay) can perform. The SSR differs in that it has no moving mechanical parts within it. It is essentially an electronic device that relies on the electrical, magnetic and optical properties of semiconductors, and electrical components to achieve its isolation and relay switching function.

Principle of Operation: Solid State Relays are similar to electromechanical relays, in that both use a control circuit and a separate circuit for switching the load. When voltage is applied to the input of the SSR, the relay is energized by a light emitting diode. The light from the diode is beamed into a light sensitive semiconductor which, in the case of zero voltage crossover relays, conditions the control circuit to turn on the output solid state switch at the next zero voltage crossover. In the case of nonzero voltage crossover relays, the output solid state switch is turned on at the precise voltage occurring at the time. Removal of the input power disables the control circuit and the solid state switch is turned off when the load current passes through the zero point of its cycle.

Applications: Since its introduction the SSR, as a technology, has gained acceptance in many areas, which had previously been the sole domain of the EMR or the Contactor. The major growth areas have come from Industrial Process Control applications; particularly heat/cool temperature control, motors, lamps, solenoids, valves, and transformers. The list of applications for the SSR is almost limitless.

The following are typical examples of SSR applications: industrial automation, electronic appliances, industrial appliances, packaging machines, tooling machines, manufacturing equipment, food equipment, security systems, industrial lighting, fire and security systems, dispensing machines, production equipment, on-board power control, traffic control, instrumentation systems, vending machines, test systems, office machines, medical equipment, display lighting, elevator control, metrology equipment, and entertainment lighting.

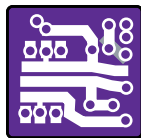
INDUSTRIAL
AUTOMATION



ALARM
SYSTEMS



ELECTRONIC
APPLIANCES



INDUSTRIAL
APPLIANCES



MEDICAL
EQUIPMENT



PACKING
MACHINES



TOOLING
MACHINES



Advantages: When used correctly in the intended application, the SSR provides many of the characteristics that are often difficult to find in the EMR; a high degree of reliability, long service life, significantly reduced electromagnetic interference, fast response and high vibration resistance are significant benefits of the SSR. The SSR has no moving parts to wear out or arcing contacts to deteriorate, which are often the primary cause of failure with an EMR.

- Long life (reliability) > 10⁹ operations
- Zero voltage turn on, low EMI / RFI
- Shock and Vibration resistant
- Random turn-on, proportional control
- No contact bounce
- Arc-less switching
- No acoustical noise
- Microprocessor compatible
- Fast response
- No moving parts

Thermal Considerations: One of the major considerations when using a SSR is properly managing the heat that is generated when switching currents higher than about 5 amps. In this scenario one must mount the base plate of the SSR onto a good heat conductor, typically aluminum; along with utilizing a good thermal transfer medium such as thermal grease or heat transfer pad. Using this technique, the SSR case to heat sink thermal resistance is reduced to a negligible value of 0.1 °C/W.

Thermal Calculations: To understand the thermal relationship between the output semiconductor junction (T_J) and the surrounding ambient temperature (T_A) one has to look at the temperature gradient or drop of temperature from junction to ambient ($T_J - T_A$); which simply equals the sum of the thermal resistances multiplied by the junction power dissipation.

$$T_J - T_A = P(R_{\Theta JC} + R_{\Theta CS} + R_{\Theta SA})$$

Where

- T_J = Junction Temperature, °C
- T_A = Ambient Temperature, °C
- P = Power Dissipation ($I_{LOAD} \times E_{DROP}$) watts
- $R_{\Theta JC}$ = Thermal resistance, junction to case, °C/W
- $R_{\Theta CS}$ = Thermal resistance, case to sink, °C/W
- $R_{\Theta SA}$ = Thermal resistance, sink to ambient, °C/W

To use the equation, the maximum junction temperature of the semiconductor must be known, typically 125 °C, along with the actual power dissipation. When these two parameters are known, the third can be found as shown in the following examples:

- 1.) Determine the maximum allowable ambient temperature, for 1 °C/W heat sink and 10 amp load (12 watts) with a maximum allowable junction temperature (T_J) of 100 °C and assume thermal resistance from junction to case ($R_{\Theta JC}$) of 1.3:

$$\begin{aligned} T_J - T_A &= P(R_{\Theta JC} + R_{\Theta CS} + R_{\Theta SA}) \\ &= 12(1.3 + 0.1 + 1.0) \\ &= 28.8 \end{aligned} \quad \text{hence,}$$

$$\begin{aligned} T_A &= T_J - 28.8 \\ &= 100 - 28.8 \\ &= 71.2 \text{ °C} \end{aligned}$$

- 2.) Determine **required heat sink thermal resistance**, for 71.2 °C maximum ambient temperature and a 10 amp load (12 watts):

$$\begin{aligned} R_{\Theta SA} &= \frac{T_J - T_A}{P} - (R_{\Theta JC} + R_{\Theta CS}) \\ &= \frac{100 - 71.2}{12} - (1.3 + 0.1) \\ &= 1 \text{ °C/W} \end{aligned}$$

- 3.) Determine **maximum load current**, for 1 °C/W heat sink and 71.2 °C ambient temperature:

$$\begin{aligned} P &= \frac{T_J - T_A}{(R_{\Theta JC} + R_{\Theta CS} + R_{\Theta SA})} \\ &= \frac{100 - 71.2}{1.3 + 0.1 + 1.0} \\ &= 12 \text{ watts} \end{aligned} \quad \text{hence,}$$

$$\begin{aligned} I_{LOAD} &= \frac{P}{E_{DROP}} \\ &= \frac{12}{1.2} \\ &= 10 \text{ amperes} \end{aligned}$$

Load Considerations: The major cause of application problems with SSRs is improper heat sinking. Following that, are problems which result from operating conditions which specific loads impose upon an SSR. The surge characteristics of the load should be carefully considered when designing in an SSR as a switching solution.

Resistive Loads: Loads of constant value of resistance are the simplest application of SSRs. Proper thermal consideration along with attention to the steady state current ratings will result in trouble free operation.

Solid State Relays – Application Data *continued*

DC Loads: This type of load should be considered inductive and a diode should be placed across the load to absorb any surges during turn off.

Lamp loads: Incandescent lamp loads, though basically resistive, present some special problems. Because the resistance of the cold filament is about 5 to 10 percent of the heated value, a large inrush current can occur. It is essential to verify that this inrush current is within the surge specifications of the SSR. One must also check that the lamp rating of the SSR is not exceeded. This is a UL rating based on the inrush of a typical lamp. Due to the unusually low filament resistance at the time of turn-on, a zero voltage turn on characteristic is particularly desirable with incandescent lamps.

Capacitive Loads: These types of loads can also prove to be problematic because of their initial appearance as short circuits. High surge currents can occur while charging, limited only by circuit resistance. Caution must be used with low impedance capacitive loads to verify that the di/dt capabilities are not exceeded. Zero voltage turn on is a particularly valuable means of limiting di/dt with capacitive loads.

Motors and Solenoids: Motor and solenoid loads can create special problems for reliable SSR functionality. Solenoids have high initial surge currents because their stationary impedance is very low. Motors also frequently have severe inrush currents during starting and can impose unusually high voltages during turn off. As a motor's rotor rotates, it creates a back EMF that reduces the flow of current. This back EMF can add to the applied line voltage and create an over voltage condition during turn off. Likewise, the inrush currents associated with mechanical loads having high starting torque or inertia, such as fans and flywheels, should be carefully considered to verify that they are within the surge capabilities of the SSR. A current shunt and oscilloscope should be used to examine the duration of the inrush current.

Transformers: In controlling transformers, the characteristics of the secondary load should be considered because they reflect the effective load on the SSR. Voltage transients from secondary loads circuits, similarly, are frequently transformer and can be imposed on the SSR. Transformers present a special problem in that, depending on the state of the transformer flux at the time of turn off, the transformer may saturate during the first half-cycle of subsequently applied voltage. This saturation can impose a very large current (10 to 100 times rated typical) on the SSR which far exceeds its half cycle surge rating. SSRs having random turn on may have a better chance of survival than a zero cross turn on device for they commonly require the transformer to support only a portion of the first half cycle of the voltage. On the other hand, a random turn on device will frequently close at the zero cross point and then the SSR must sustain the worst case saturation current. A zero cross turn on device has the advantage that it turns on in a known mode and will immediately demonstrate the worst case condition. The use of a current shunt and an oscilloscope is recommended to verify that the half cycle surge capability is not exceeded.

A rule of thumb in applying an SSR to a transformer load is to select an SSR having a half cycle current surge rating greater than the maximum applied line voltage divided by the transformer primary resistance. The primary resistance is usually easily measured and can be relied on as a minimum impedance limiting the first half cycle of inrush current. The presence of some residual flux plus the saturated reactance of the primary will then further limit, in the worst case, the half cycle surge safely within the surge rating of the SSR.

Switching Devices: The thyristor family of semiconductors consists of several very useful devices. The most widely used of this family are metal-oxide semiconductor field effect transistors (MOSFETs), silicon controlled rectifiers (SCRs), Triac, and Alternistor Triac. In many applications these devices perform key functions and therefore it is imperative that one understand their advantages as well as their shortcomings to properly specify a reliable system. Once applied correctly thyristors are a real asset in meeting environmental, speed, and reliability specifications which their electro-mechanical counterparts could not fulfill.

MOSFET: The MOSFET is a semiconductor device that consists of two metal-oxide semiconductor field effect transistors (MOSFETs), one N-type and one P-type, integrated on a single silicon chip. The MOSFET is ideal for switching DC loads.

Triacs: A TRIAC, is an electronic component approximately equivalent to two silicon-controlled rectifiers joined in inverse parallel (paralleled but with the polarity reversed) and with their gates connected together. This results in a bidirectional electronic switch which can conduct current in either direction. The Triac is ideal for switching resistive AC loads.

Alternistor Triac: Used to switch AC loads; the Alternistor has been specifically designed for applications that switch highly inductive loads. A special chip offers similar performance as two SCRs wired inverse parallel (back-to-back), providing better turn-off behavior than a standard Triac. The Alternistor Triac is an economical solution; ideal for switching inductive AC loads.

SCR: The silicon-controlled rectifier is a 4-layer solid state device that controls current flow. The SCR acts as a switch, conducting when its gate receives a current pulse, and continue to conduct for as long as it is forward biased. The SCR is ideal for switching all types of AC loads.

Heat Sinking: Thermal management is a fundamental consideration in the design and use of solid state relays (SSRs) because of the contact dissipation (typically 1 W per amp). It is, therefore, vital that sufficient heat sinking is provided, or the life and switching reliability of the SSR will be compromised.

In order to properly size a heat sink one has to consider at what goes into getting the thermal resistance **Rth** (X° C/W) numbers in order to understand what it means.

Let's first begin by defining some variables.

Tr - Temperature rise

Ta - Ambient temperature (example 22°C)

Th - Heat sink temperature (example 54°C)

Vh - Voltage to heater (example 12V)

Ih - Current to heater (example 3.5A)

Ph - Power applied to heat sink

Rth - Thermal resistance (in °C/W)

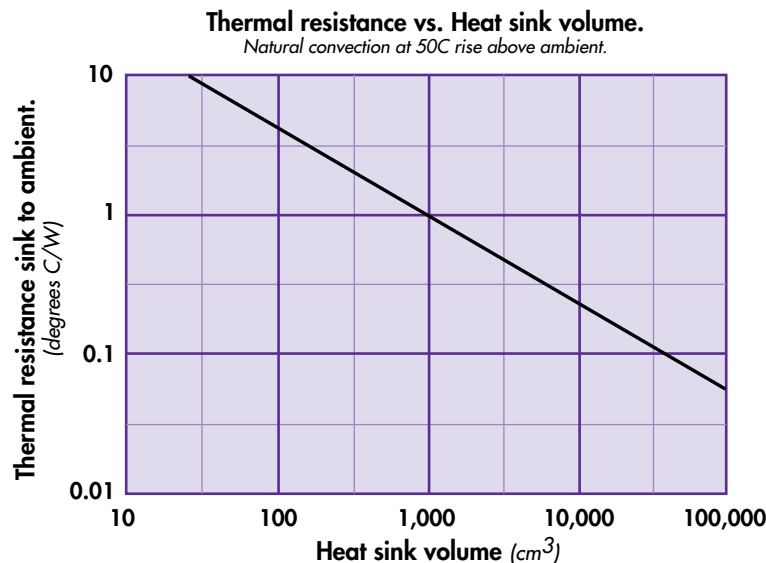
so...

$$Tr = Th - Ta = 54 - 22 = 32^{\circ}C$$

$$Ph = Vh * Ih = 12 * 3.5 = 42W$$

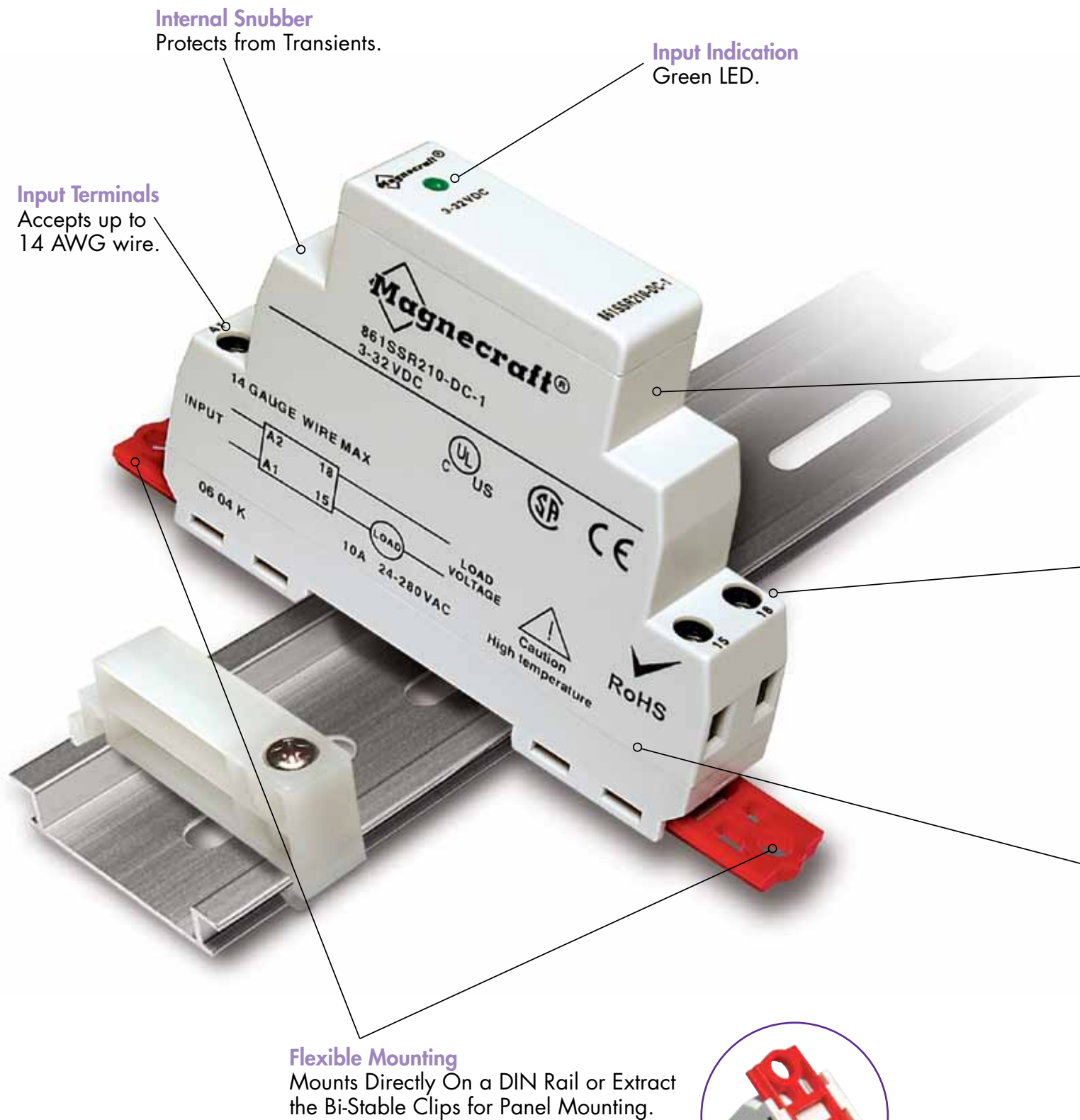
$$Rth = Tr / Ph = 32 / 42 = 0.76^{\circ}C/W$$

Okay, now that we have calculated the Thermal Resistance (**Rth**) we can look at the Thermal resistance vs. Heat sink volume curve.



Using the attached curve, one can see that in our example one would need around 1000 cm cubed sized heat sink in order to successfully sink the amount of heat generated by the device.

Advantages of the 861 Solid State Relay



The new DIN-Mountable **861 Solid State** relay with an internal heat sink is the first complete solid state relay with NO moving parts; in a modular package.

Solid State Circuitry

No Moving Parts Involved.

Output Terminals

Isolation of the Inputs from the Outputs. Accepts up to 14 AWG wire.



Integral Heat Sink

Factory Tested Thermal Management.

- Offers a "one stop solution" for your power management system.
- Available in most popular SSR configurations.
- First fully-integrated, modular-style solid state relay on the market.
- Engineering availability allows for customized relay solutions.



**Optional Panel Adapter
(16-788C1)**

See Section 3 p.18

We at Magnecraft are excited at the breadth of products and solutions we are able to offer engineers and designers. And this is just the beginning. We will continue to develop high value products—with innovative features not offered anywhere else in the industry.

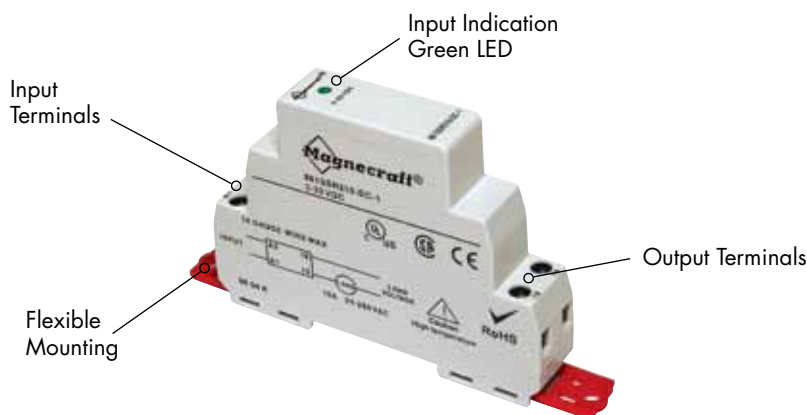
861 Solid State Relay/SPST-NO, 8-15 Amp Rating



UL Listed
File No. E258297



NEW
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NEW



General Specifications (@ 25° C) (UL 508)

Output Characteristics		Units	861SSR210-DC-1
Number and type of Contacts			SPST-NO
Switching Device			SCR (2)
Current rating		A	10
Switching voltage		V	24...280 AC
Switching Type			Zero Cross
Maximum zero turn-on voltage (V _{pk})		V	35
Maximum Rate of Rise Off State Voltage (dv/dt)		V/us	500
Incandescent Lamp Ampere Rating (rms)		A	8
Motor Load Rating (rms)		A	4.5
Min. Load current to maintain on		mA	50
Non-Repetitive Surge Current (1 cycle)		A	500
Max. RMS overload current (1 second)		A	24
Max. Off state leakage current (rms)		mA	10
Typical On State Voltage Drop (rms)		V	1.25 AC
Max. On State Voltage Drop (rms)		V	1.6 AC
Maximum I ² T for Fusing (A ²)			1250
Input Characteristics			
Voltage Range		V	3...32 DC
Must Release Voltage		V	1 DC
Nominal Input Impedance		Ω	Current Regulator
Typical Input Current @ 5VDC or 240VAC		mA	16
Reverse Polarity Protection			Yes
Performance Characteristics			
Operating time (response time)	On	ms	8.3
	Off	ms	8.3
Rated insulation voltage	Input to Output	V	2500 AC
Dielectric strength	Terminals to Chassis	V	2500 AC
Environment			
Product certifications	Standard version		UL, CSA, CE
Ambient air temperature around the device	Storage	°C	-40...+100
	Operation	°C	-30...+80
Degree of protection			IP 20
Miscellaneous Characteristics			
Thermal Resistance (Junction to Case)		°C/W	0.66
Integral Heat sink		°C/W	4.0
Weight		g (oz)	127 (4.1)
LED			Green
Terminal Wire Capacity		AWG (mm2)	14 (2.1)
Terminal Torque (maximum)		in lb (Nm)	7.1 (0.8)

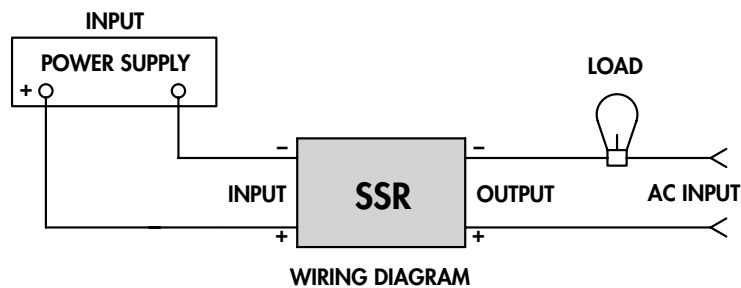
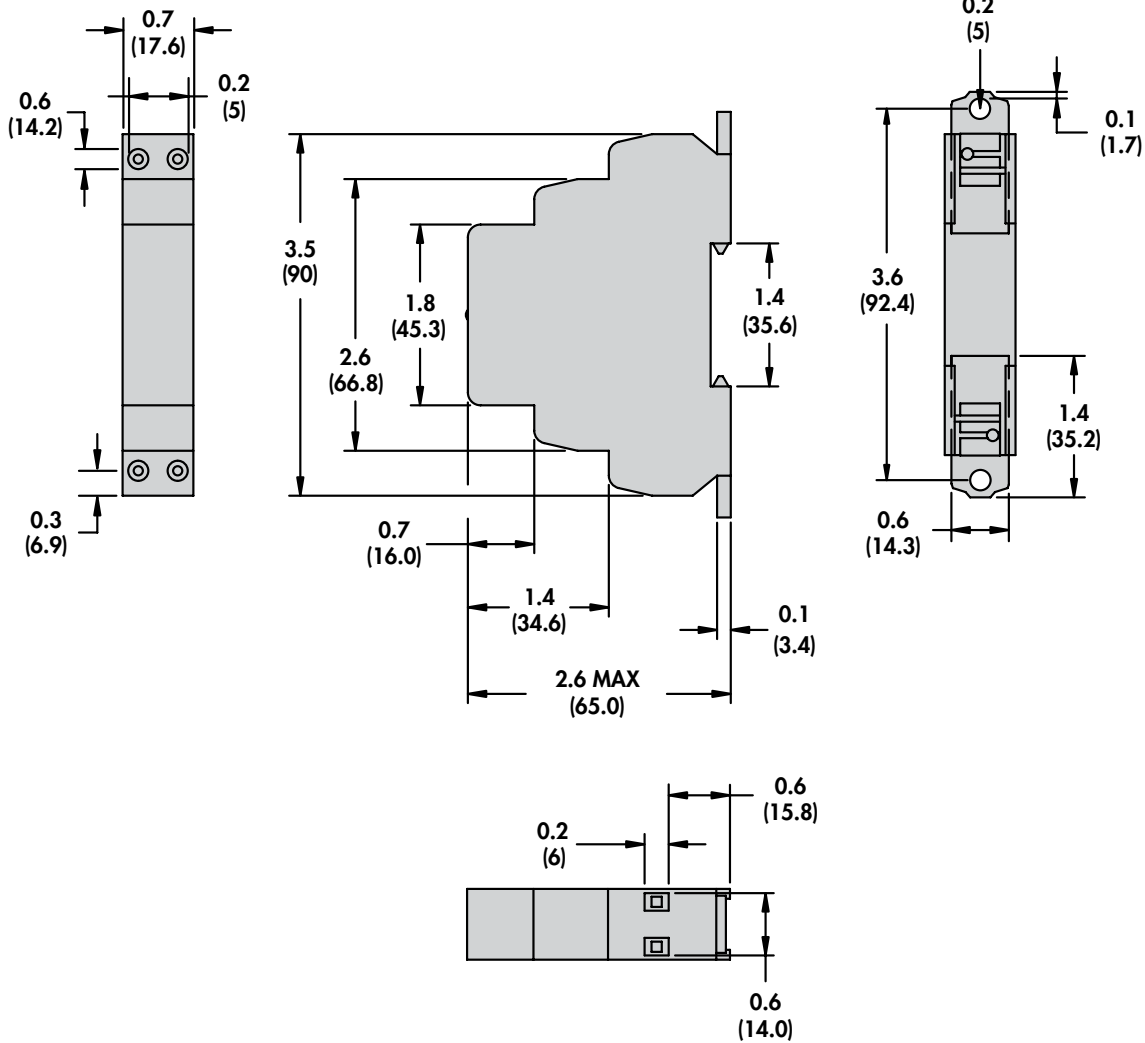
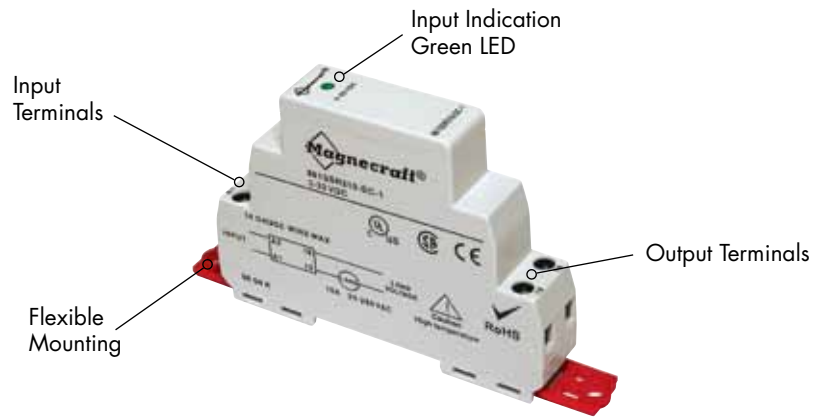


861SSR210-AC-1	861SSRA208-DC-1	861SSRA208-AC-1	861SSR115-DD	861SSR208-DD
SPST-NO	SPST-NO	SPST-NO	SPST-NO	SPST-NO
SCR (2)	Alternistor Triac	Alternistor Triac	MOSFET	MOSFET
10	8	8	15	8
24....280 AC	24....280 AC	24....280 AC	3....50 DC	3....150 DC
Zero Cross	Zero Cross	Zero Cross	DC Switching	DC Switching
35	35	35	N/A	N/A
500	475	350	N/A	N/A
8	5	5	N/A	N/A
4.5	3	3	N/A	N/A
50	150	150	20	20
500	200	200	50	35
24	24	24	24	17
10	10	10	10	10
1.25 AC	1.25 AC	1.25 AC	1.25 DC	1.25 DC
1.6 AC	1.6 AC	1.6 AC	1.6 DC	1.6 DC
1250	250	250	N/A	N/A
90....280 AC, 80....140 DC	3....32 DC	90....280 AC, 80....140 DC	3.5....32 DC	3.5....32 DC
10 AC	1 DC	10 AC	1 DC	1 DC
16....25K	Current Regulator	16....25K	Current Regulator	Current Regulator
12	12	12	12	12
N/A	Yes	N/A	Yes	Yes
40	8.3	40	5	5
80	8.3	80	5	5
2500 AC	2500 AC	2500 AC	2500 AC	2500 AC
2500 AC	2500 AC	2500 AC	2500 AC	2500 AC
UL, CSA, CE	UL, CSA, CE	UL, CSA, CE	UL, CSA, CE	UL, CSA, CE
-40...+100	-40...+100	-40...+100	-40...+100	-40...+100
-30...+80	-30...+80	-30...+80	-30...+80	-30...+80
IP 20	IP 20	IP 20	IP 20	IP 20
0.66	2.0	2.0	1.4	0.5
4.0	4.0	4.0	4.0	4.0
127 (4.1)	127 (4.1)	127 (4.1)	127 (4.1)	127 (4.1)
Green	Green	Green	Green	Green
14 (2.1)	14 (2.1)	14 (2.1)	14 (2.1)	14 (2.1)
7.1 (0.8)	7.1 (0.8)	7.1 (0.8)	7.1 (0.8)	7.1 (0.8)

861 Solid State Relay/SPST-NO, 8-15 Amp Rating *continued*



**NEW
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Optional Panel Adapter
(16-788C1)
See Section 3 p.18

Standard Part Numbers

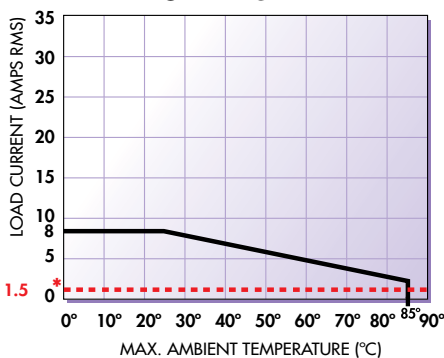
BOLD-FACED PART NUMBERS ARE NORMALLY STOCKED

AC Operated	Input Voltage Range	Output Voltage Range	Contact Configuration	Switching Type	Rated Current Load (Amps)
861SSRA208-AC-1	90...280 VAC	24...280 VAC	SPST-NO	Zero Cross	8
861SSR210-AC-1	90...280 VAC	24...280 VAC	SPST-NO	Zero Cross	10
861SSRA408-AC-1	90...280 VAC	48...480 VAC	SPST-NO	Zero Cross	8
861SSR410-AC-1	90...280 VAC	48...480 VAC	SPST-NO	Zero Cross	10
861SSR610-AC-1	90...280 VAC	48...600 VAC	SPST-NO	Zero Cross	10
861SSRA208-AC-2	90...280 VAC	24...280 VAC	SPST-NO	Random	8
861SSR210-AC-2	90...280 VAC	24...280 VAC	SPST-NO	Random	10
861SSRA408-AC-2	90...280 VAC	48...480 VAC	SPST-NO	Random	8
861SSR410-AC-2	90...280 VAC	48...480 VAC	SPST-NO	Random	10
861SSR610-AC-2	90...280 VAC	48...600 VAC	SPST-NO	Random	10
DC Operated					
861SSRA208-DC-1	3...32 VDC	24...280 VAC	SPST-NO	Zero Cross	8
861SSR210-DC-1	3...32 VDC	24...280 VAC	SPST-NO	Zero Cross	10
861SSRA408-DC-1	3...32 VDC	48...480 VAC	SPST-NO	Zero Cross	8
861SSR410-DC-1	3...32 VDC	48...480 VAC	SPST-NO	Zero Cross	10
861SSR610-DC-1	3...32 VDC	48...600 VAC	SPST-NO	Zero Cross	10
861SSRA208-DC-2	3...32 VDC	24...280 VAC	SPST-NO	Random	8
861SSR210-DC-2	3...32 VDC	24...280 VAC	SPST-NO	Random	10
861SSRA208-DC-4	3...32 VDC	24...280 VAC	SPST-NC	Random	8
861SSR210-DC-4	3...32 VDC	24...280 VAC	SPST-NC	Random	10
861SSRA408-DC-2	3...32 VDC	48...480 VAC	SPST-NO	Random	8
861SSR410-DC-2	3...32 VDC	48...480 VAC	SPST-NO	Random	10
861SSR610-DC-2	3...32 VDC	48...600 VAC	SPST-NO	Random	10
861SSR115-DD	3.5...32 VDC	3...50 VDC	SPST-NO	DC Switch	15
861SSR208-DD†	3.5...32 VDC	3...150 VDC	SPST-NO	DC Switch	8

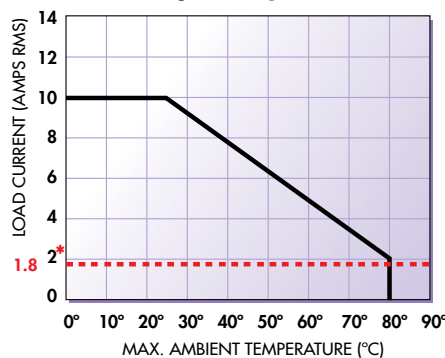
Part Number Builder

Series	Output Type	Output Voltage	Output Current	Input Voltage	Contact Config. & Switching Type
861	SSR = SCR	1 = 3...50 VDC	08 = 8 AMPS	AC = 90...280 VAC	1 = SPST-NO, Zero Cross
	SSRA = ALTERNISTOR TRIAC	2 = 24...280 VAC	10 = 10 AMPS	DC = 3...32 VDC	2 = SPST-NO, Random
		2 = 3...150 VDC (DD Only)†	15 = 15 AMPS	DD = 3.5...32 VDC	4 = SPST-NC, Random
		4 = 48...480 VAC			
		6 = 48...600 VAC			

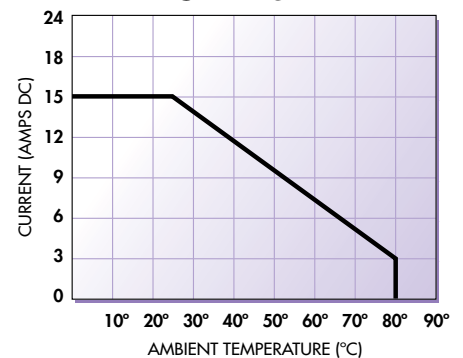
8 AMP STYLE



10 AMP STYLE

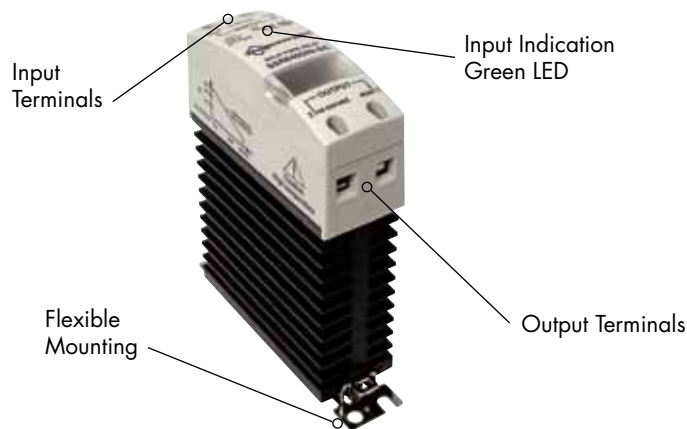


15 AMP STYLE



* Indicates current cut-off.

SSRDIN/SPST, 10 - 40 Amp Rating



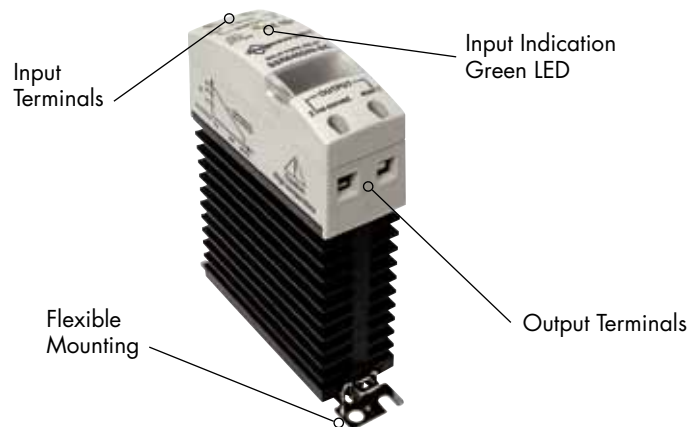
General Specifications (@ 25° C) (UL 508)

Output Characteristics		Units	SSR210DIN-AC	SSR225DIN-AC
Number and type of Contacts			SPST-NO	SPST-NO
Switching Device			SCR (2)	SCR (2)
Current rating	A		10	25
Switching voltage	V		24....280 AC	24....280 AC
Switching Type			Zero Cross	Zero Cross
Maximum zero turn-on voltage (Vpk)	V		35	35
Maximum Rate of Rise Off State Voltage (dv/dt)	V/us		500	500
Incandescent Lamp Ampere Rating (rms)	A		8	16
Motor Load Rating (rms)	A		4.5	8
Min. Load current to maintain on	mA		50	120
Non-Repetitive Surge Current (1 cycle)	A		83	800
Max. RMS overload current (1 second)	A		24	40
Max. Off state leakage current (rms)	mA		10	10
Typical On State Voltage Drop (rms)	V		1.25 AC	1.35 AC
Max. On State Voltage Drop (rms)	V		1.6 AC	1.8 AC
Maximum I ² T for Fusing (A ²)			83	3700
Input Characteristics				
Voltage Range	V		90....280 AC, 80....140 DC	90....280 AC, 80....140 DC
Must Release Voltage	V		10 AC	10 AC
Nominal Input Impedance	Ω		16....25K	16....25K
Typical Input Current @ 5VDC or 240VAC	mA		12	12
Reverse Polarity Protection			N/A	N/A
Performance Characteristics				
Operating time (response time)	On	ms	8.3	8.3
	Off	ms	8.3	8.3
Rated insulation voltage	Input to Output	V	4000 AC	4000 AC
Dielectric strength	Terminals to Chassis	V	4000 AC	4000 AC
Environment				
Product certifications	Standard version		UL, CSA, CE	UL, CSA, CE
Ambient air temperature around the device	Storage	°C	-40...+100	-40...+100
	Operation	°C	-30...+80	-30...+80
Degree of protection			IP 20	IP 20
Miscellaneous Characteristics				
Thermal Resistance (Junction to Case)		°C/W	1.5	0.43
Integral Heat sink		°C/W	2.2	2.2
Weight		g (oz)	320 (11.3)	326 (11.5)
LED	Input		Green	Green
Terminal Wire Capacity		AWG (mm ²)	8 (10)	8 (8.4)
Terminal Torque (maximum)		in lb (Nm)	12.5 (1.4)	12.5 (1.4)



SSR240DIN-AC	SSR610DIN-AC	SSR625DIN-AC	SSR640DIN-AC
SPST-NO	SPST-NO	SPST-NO	SPST-NO
SCR (2)	SCR (2)	SCR (2)	SCR (2)
40	10	25	40
24....280 AC	48....600 AC	48....600 AC	48....600 AC
Zero Cross	Zero Cross	Zero Cross	Zero Cross
35	35	35	35
500	200	700	500
20	8	16	20
14	4.5	8	14
250	80	250	250
800	83	1000	800
100	24	50	100
10	10	10	10
1.6 AC	1.25 AC	1.35 AC	1.6 AC
1.6 AC	1.6 AC	1.6 AC	1.6 AC
3700	83	1700	3700
90....280 AC, 80....140 DC	90....280 AC, 80....140 DC	90....280 AC, 80....140 DC	90....280 AC, 80....140 DC
10 AC	10 AC	10 AC	10 AC
13K	16....25K	16....25K	13K
16	12	12	16
N/A	N/A	N/A	N/A
10	8.3	8.3	10
10	8.3	8.3	10
4000 AC	4000 AC	4000 AC	4000 AC
4000 AC	4000 AC	4000 AC	4000 AC
UL, CSA, CE	UL, CSA, CE	UL, CSA, CE	UL, CSA, CE
-40...+100	-40...+100	-40...+100	-40...+100
-30...+80	-30...+80	-30...+80	-30...+80
IP 20	IP 20	IP 20	IP 20
0.43	1.8	0.43	0.43
2.2	2.2	2.2	2.2
332 (11.7)	320 (11.3)	326 (11.5)	332 (11.7)
Green	Green	Green	Green
8 (10)	8 (10)	8 (10)	8 (10)
12.5 (1.4)	12.5 (1.4)	12.5 (1.4)	12.5 (1.4)

SSRDIN/SPST, 10 - 40 Amp Rating *continued*



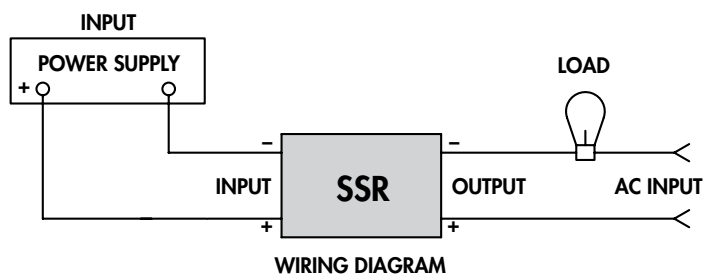
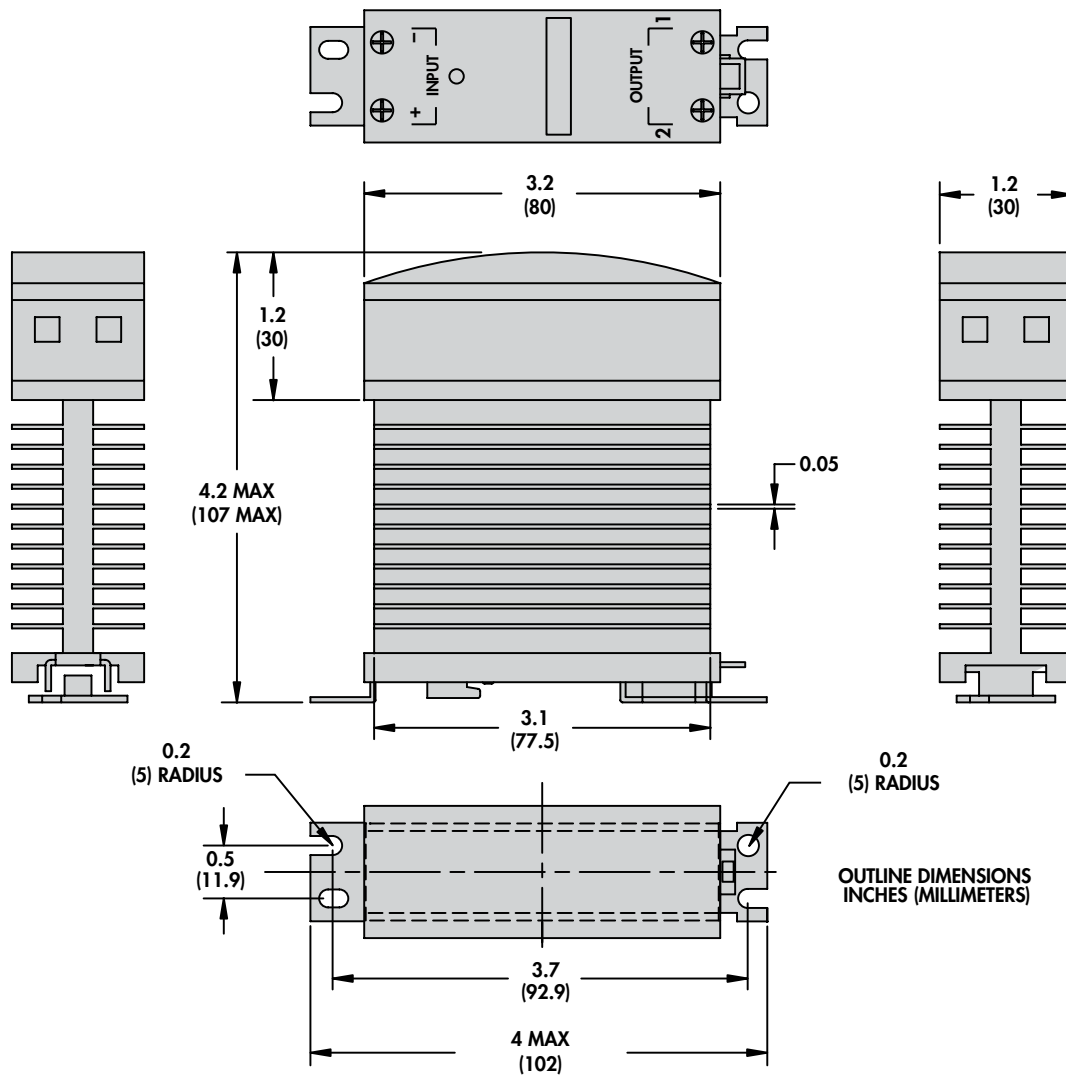
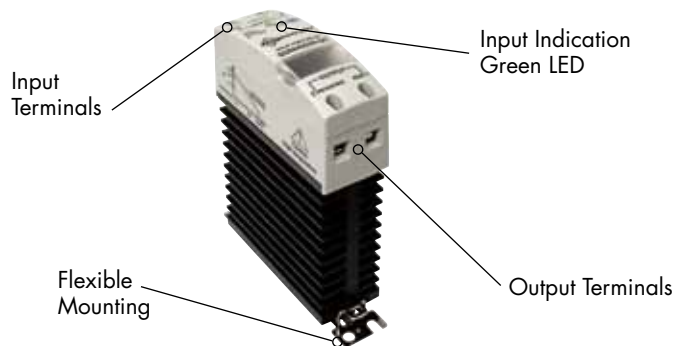
General Specifications (@ 25° C) (UL 508)

Output Characteristics		Units	SSR210DIN-DC	SSR225DIN-DC
Number and type of Contacts			SPST-NO	SPST-NO
Switching Device			SCR (2)	SCR (2)
Current rating	A		10	25
Switching voltage	V		24...280 AC	24...280 AC
Switching Type			Zero Cross	Zero Cross
Maximum zero turn-on voltage (V _{pk})	V		35	35
Maximum Rate of Rise Off State Voltage (dv/dt)	V/us		200	500
Incandescent Lamp Ampere Rating (rms)	A		8	16
Motor Load Rating (rms)	A		4.5	8
Min. Load current to maintain on	mA		50	120
Non-Repetitive Surge Current (1 cycle)	A		83	800
Max. RMS overload current (1 second)	A		24	40
Max. Off state leakage current (rms)	mA		10	10
Typical On State Voltage Drop (rms)	V		1.25 AC	1.25 AC
Max. On State Voltage Drop (rms)	V		1.6 AC	1.6 AC
Maximum I ² T for Fusing (A ²)			83	3700
Input Characteristics				
Voltage Range	V		3...32	3...32
Must Release Voltage	V		1 DC	1 DC
Nominal Input Impedance	Ω		Current Regulator	Current Regulator
Typical Input Current @ 5VDC or 240VAC	mA		16	16
Reverse Polarity Protection			Yes	Yes
Performance Characteristics				
Operating time (response time)	On	ms	8.3	8.3
	Off	ms	8.3	8.3
Rated insulation voltage	Input to Output	V	4000 AC	4000 AC
Dielectric strength	Terminals to Chassis	V	4000 AC	4000 AC
Environment				
Product certifications	Standard version		UL, CSA, CE	UL, CSA, CE
Ambient air temperature	Storage	°C	-40...+100	-40...+100
around the device	Operation	°C	-30...+80	-30...+80
Degree of protection			IP 20	IP 20
Miscellaneous Characteristics				
Thermal Resistance (Junction to Case)		°C/W	1.5	0.43
Integral Heat sink		°C/W	2.2	2.2
Weight		g (oz)	320 (11.3)	326 (11.5)
LED	Input		Green	Green
Terminal Wire Capacity		AWG (mm ²)	8 (10)	8 (10)
Terminal Torque (maximum)		in lb (Nm)	12.5 (1.4)	12.5 (1.4)



SSR240DIN-DC	SSR610DIN-DC	SSR625DIN-DC	SSR640DIN-DC
SPST-NO	SPST-NO	SPST-NO	SPST-NO
SCR (2)	SCR (2)	SCR (2)	SCR (2)
40	10	25	40
24....280 AC	48....600 AC	48....600 AC	48....600 AC
Zero Cross	Zero Cross	Zero Cross	Zero Cross
35	35	35	35
500	200	700	500
20	8	16	20
14	4.5	8	14
250	80	250	250
800	83	1000	800
100	24	50	100
10	10	10	10
1.6 AC	1.25 AC	1.35 AC	1.6 AC
1.6 AC	1.6 AC	1.6 AC	1.6 AC
3700	83	1700	3700
3....32	3....32	3....32	3....32
1 DC	1 DC	1 DC	1 DC
Current Regulator	Current Regulator	Current Regulator	Current Regulator
16	16	16	16
Yes	Yes	Yes	Yes
10	8.3	8.3	10
10	8.3	8.3	10
4000 AC	4000 AC	4000 AC	4000 AC
4000 AC	4000 AC	4000 AC	4000 AC
UL, CSA, CE	UL, CSA, CE	UL, CSA, CE	UL, CSA, CE
-40...+100	-40...+100	-40...+100	-40...+100
-30...+80	-30...+80	-30...+80	-30...+80
IP 20	IP 20	IP 20	IP 20
0.43	1.8	0.43	0.43
2.2	2.2	2.2	2.2
332 (11.7)	320 (11.3)	326 (11.5)	332 (11.7)
Green	Green	Green	Green
8 (10)	8 (10)	8 (10)	8 (10)
12.5 (1.4)	12.5 (1.4)	12.5 (1.4)	12.5 (1.4)

SSRDIN/SPST, 10 - 40 Amp Rating *continued*



Standard Part Numbers

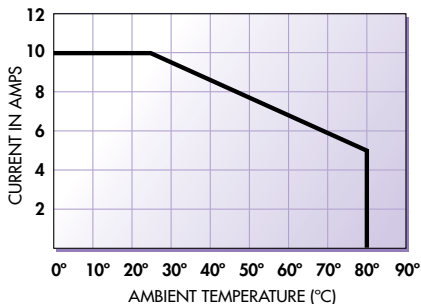
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AC Operated	Input Voltage Range	Output Voltage Range	Contact Configuration	Switching Type	Rated Current Load (Amps)
SSR210DIN-AC	90....280 VAC	24....280 VAC	SPST-NO	Zero Cross	10
SSR225DIN-AC	90....280 VAC	24....280 VAC	SPST-NO	Zero Cross	25
SSR240DIN-AC	90....280 VAC	24....280 VAC	SPST-NO	Zero Cross	40
SSR610DIN-AC	90....280 VAC	48....600 VAC	SPST-NO	Zero Cross	10
SSR625DIN-AC	90....280 VAC	48....600 VAC	SPST-NO	Zero Cross	25
SSR640DIN-AC	90....280 VAC	48....600 VAC	SPST-NO	Zero Cross	40
SSR210DIN-AC-2	90....280 VAC	24....280 VAC	SPST-NO	Random	10
SSR210DIN-AC-4	90....280 VAC	24....280 VAC	SPST-NC	Random	10
SSR225DIN-AC-2	90....280 VAC	24....280 VAC	SPST-NO	Random	25
SSR225DIN-AC-4	90....280 VAC	24....280 VAC	SPST-NC	Random	25
SSR610DIN-AC-2	90....280 VAC	48....600 VAC	SPST-NO	Random	10
SSR610DIN-AC-4	90....280 VAC	48....600 VAC	SPST-NC	Random	10
SSR625DIN-AC-2	90....280 VAC	48....600 VAC	SPST-NO	Random	25
SSR625DIN-AC-4	90....280 VAC	48....600 VAC	SPST-NC	Random	25
DC Operated					
SSR210DIN-DC	3....32 VDC	24....280 VAC	SPST-NO	Zero Cross	10
SSR225DIN-DC	3....32 VDC	24....280 VAC	SPST-NO	Zero Cross	25
SSR240DIN-DC	3....32 VDC	24....280 VAC	SPST-NO	Zero Cross	40
SSR610DIN-DC	3....32 VDC	48....600 VAC	SPST-NO	Zero Cross	10
SSR625DIN-DC	3....32 VDC	48....600 VAC	SPST-NO	Zero Cross	25
SSR640DIN-DC	3....32 VDC	48....600 VAC	SPST-NO	Zero Cross	40
SSR210DIN-DC-2	3....32 VDC	24....280 VAC	SPST-NO	Random	10
SSR210DIN-DC-4	3....32 VDC	24....280 VAC	SPST-NC	Random	10
SSR225DIN-DC-2	3....32 VDC	24....280 VAC	SPST-NO	Random	25
SSR225DIN-DC-4	3....32 VDC	24....280 VAC	SPST-NC	Random	25
SSR610DIN-DC-2	3....32 VDC	48....600 VAC	SPST-NO	Random	10
SSR610DIN-DC-4	3....32 VDC	48....600 VAC	SPST-NC	Random	10
SSR625DIN-DC-2	3....32 VDC	48....600 VAC	SPST-NO	Random	25
SSR625DIN-DC-4	3....32 VDC	48....600 VAC	SPST-NC	Random	25

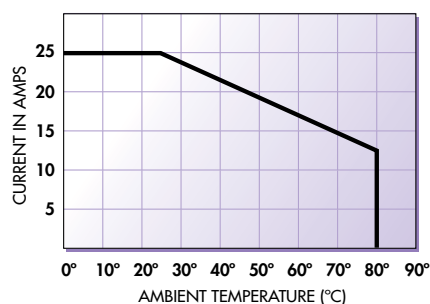
Part Number Builder

Series	Output Voltage	Output Current	Input Voltage
SSR	2 = 24 to 280 VAC	10 = 10 AMPS	DIN-DC = 3 - 32 VDC; SPST-NO; Zero Cross
	6 = 48 to 600 VAC	25 = 25 AMPS	DIN-DC-2 = 3 - 32 VDC; SPST-NO; Random
		40 = 40 AMPS	DIN-DC-4 = 3 - 32 VDC; SPST-NC; Random
			DIN-AC = 90 - 280 VAC; SPST-NO; Zero Cross
			DIN-AC-2 = 90 - 280 VAC; SPST-NO; Random
			DIN-AC-4 = 90 - 280 VAC; SPST-NC; Random

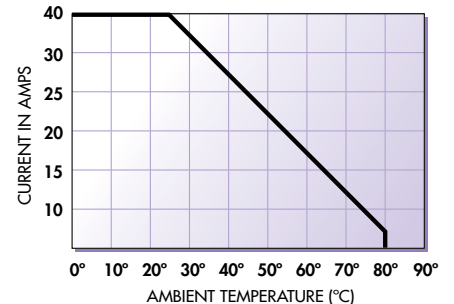
10 AMP MODELS



25 AMP MODELS



40 AMP MODELS



Advantages of the Class 6 Solid State Relay

The Complete System Solution!



Optional Heat Sink
(SSR-HS-1)
Section 3 p.20



Optional Thermal Pad
(SSR-TP-1)
Section 3 p.21

We at Magnecraft strive to be your one-stop-shop for all of your solid state relay needs. The new line of 6 series solid-state relays give industrial relay users an energy-efficient current switching alternative. Depending on the application, these solid-state relays offer a number of advantages over electromechanical relays, including longer life cycles, less energy consumption and reduced maintenance costs. This is why great care and attention was given when developing the next generation of “Hockey Puck” style SSRs. These new SSRs will be finger-safe , fit a pre-cut heat transfer thermal pad (sold separately) and have the ability to be mounted onto a factory tested pre-drilled and tapped heat sink (sold separately).

Magnecraft’s expertise in both SSR design and thermal management enables us to provide customers with a solution to their solid state relay requirements. This solution comes ready-to-use, virtually eliminating in-house assembly and complex heat sink calculations. Furthermore, each SSR, thermal pad (sold separately) and heat sink assembly (sold separately) utilizes the reliability and technology only available in our 6 series solid state relays. These features, coupled with Magnecraft’s superior customer service and engineering support team, provide our customers with a level of convenience not easily found in the market today!



Evolut

Legacy

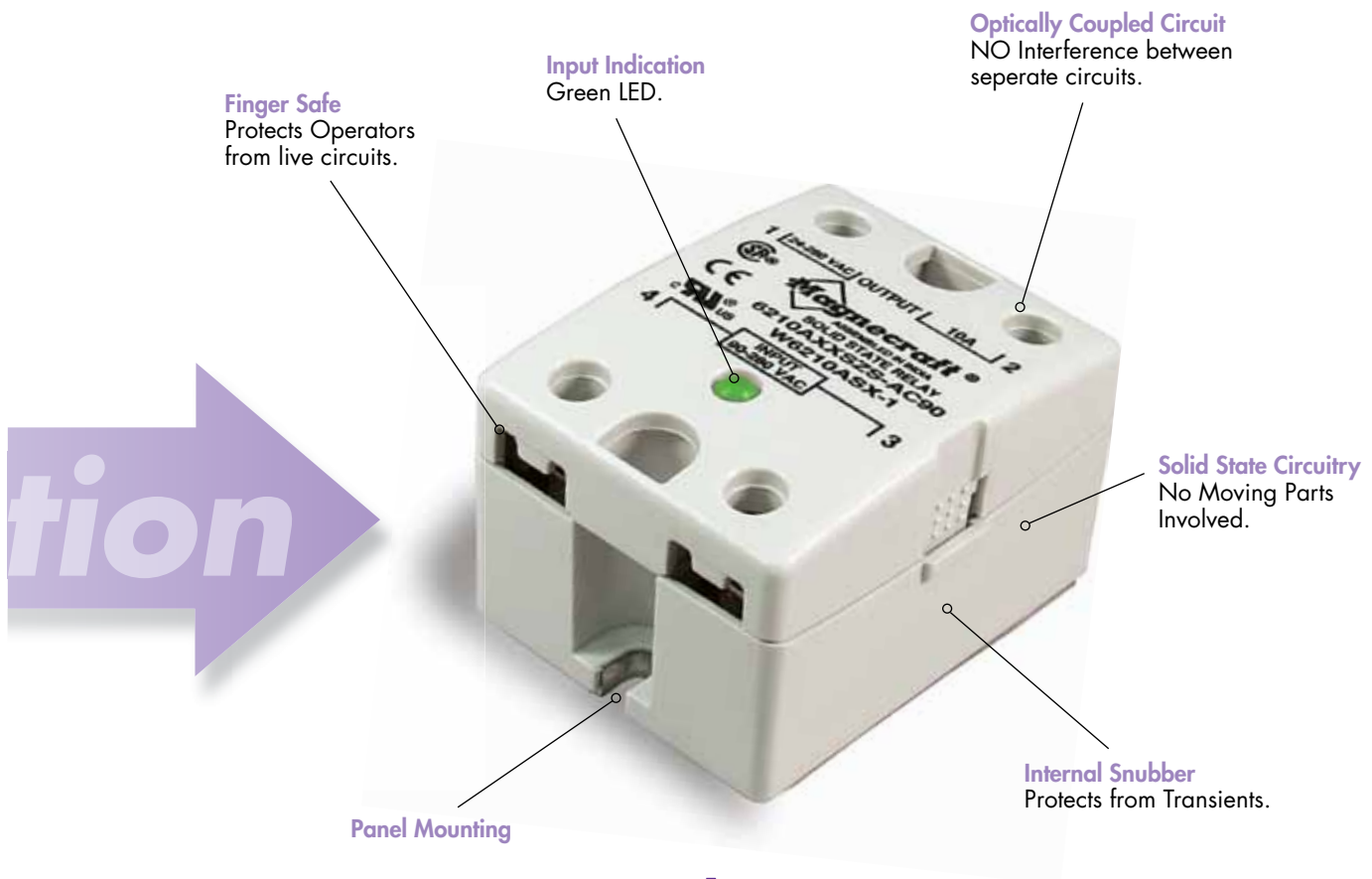
The Class 6 is also available
with **Blade Terminals**.



The new finger-safe Class 6* "Hockey Puck" Style Solid State Relay (SSR) expands and enhances the current Magnecraft Solid State Relay product line.

This product features a finger-safe cover and LED Status Indicator. The optically coupled circuitry isolates the input from the output to give pure solid state performance. This product carries with it agency certifications from UL, CSA, and CE.

*Available for products up to 40 Amps (AC Load) and 12 Amps (DC Load).

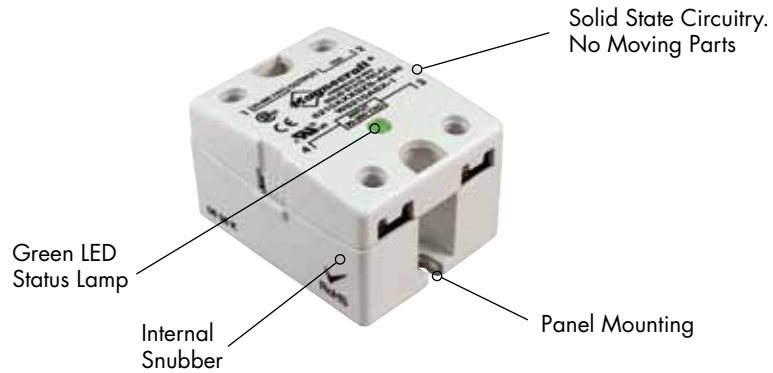


New

Class 6 Solid State Relays/SPST-NO, SPST-NC, DPST-NO, 10-125 Amp Rating



NEW
NEW
NEW
NEW
NEW



General Specifications (@ 25° C) (UL 508)

		New Part # Superceding Part #	Units	6210AXXSZ5-AC90 6210ASX-1
Output Characteristics				
Number and type of Contacts				SPST-NO
Switching Device				SCR [2]
Current rating			A	10
Switching voltage			V	24....280 AC
Switching Type				Zero Cross
Maximum Rate of Rise Off State Voltage (dv/dt)			V/us	200
Incandescent Lamp Ampere Rating (rms)			A	8
Motor Load Rating (rms)			A	4.5
Min. Load current to maintain on			mA	50
Non-Repetitive Surge Current (1 cycle)			A	83
Max. RMS overload current (1 second)			A	24
Max. Off state leakage current (rms)			mA	8
Peak Blocking Voltage			Vpk	600
Typical On State Voltage Drop (rms)			V	1.6 AC
Max. On State Voltage Drop (rms)			V	1.6 AC
Maximum I ² T for Fusing (A ²)				72
Input Characteristics				
Voltage Range			V	90...280 AC/80...140 DC
Must Release Voltage			V	10 AC
Nominal Input Impedance			Ω	13K
Typical Input Current @ 5VDC or 240VAC			mA	20
Reverse Polarity Protection				N/A
Performance Characteristics				
Operating Time (response time)	On		ms	8.3
	Off		ms	8.3
Rated Insulation Voltage	Input to Output		V	4000 AC
Dielectric strength	Terminals to Chassis		V	4000 AC
Environment				
Product certifications	Standard version			UR, CSA, CE
Ambient air temperature around the device	Storage		°C	-40...+100
	Operation		°C	-40...+80
Degree of protection				IP 20
Miscellaneous Characteristics				
Thermal Resistance (Junction to Case)			°C/W	3.5
Weight			g (oz)	100 (3.5)
LED	Input			Green
Input Terminals				M3.5 or equivalent
Output Terminals				M4 or equivalent
Mounting Screw Torque			Nm	1.0



**Thermal Pad
(SSR-TP-1)**
Section 3 p.21



**Blade Terminals
DPST-NO**



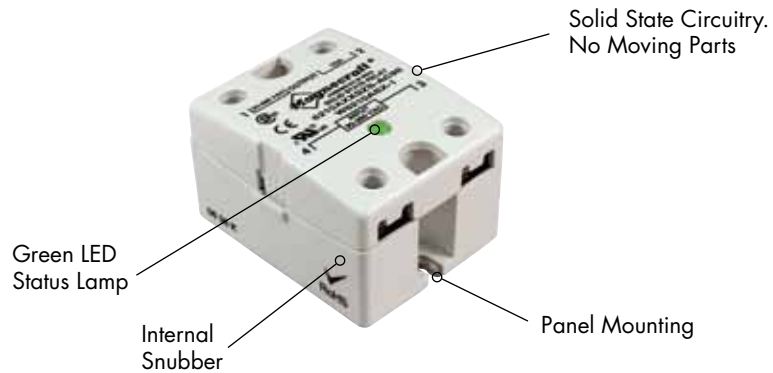
**Heat Sink
(SSR-HS-1)**
Section 3 p.20

6225AXXSZS-AC90	6250AXXSZS-AC90	6275AXXSZS-AC90	6210AXXSZS-DC3	6225AXXSZS-DC3
6225ASX-1	6250ASX-1	6275ASX-1	6210DSX-1	6225DSX-1
SPST-NO	SPST-NO	SPST-NO	SPST-NO	SPST-NO
SCR (2)	SCR (2)	SCR (2)	SCR (2)	SCR (2)
25	50	75	10	25
24...280 AC	24...280 AC	24...280 AC	24...280 AC	24...280 AC
Zero Cross	Zero Cross	Zero Cross	Zero Cross	Zero Cross
500	500	500	200	500
16	39	39	8	16
8	14	25	4.5	8
120	250	250	50	120
250	520	1150	83	250
40	100	150	24	40
8	10	10	10	10
600	600	600	600	600
1.6 AC	1.1 AC	1.8 AC	1.6 AC	1.6 AC
1.6 AC	1.8 AC	1.8 AC	1.6 AC	1.6 AC
312	1250	5000	83	250
90...280 AC/80...140 DC	90...280 AC/80...140 DC	90...280 AC/80...140 DC	3...32	3...32
10 AC	10 AC	10 AC	1 DC	1 DC
13K	13K	13K	Current Regulator	Current Regulator
20	20	20	16	16
N/A	N/A	N/A	Yes	Yes
8.3	8.3	8.3	8.3	8.3
8.3	8.3	8.3	8.3	8.3
4000 AC	4000 AC	4000 AC	4000 AC	4000 AC
4000 AC	4000 AC	4000 AC	4000 AC	4000 AC
UR, CSA, CE	UR, CSA, CE	UR, CSA, CE	UR, CSA, CE	UR, CSA, CE
-40...+100	-40...+100	-40...+100	-40...+100	-40...+100
-40...+80	-40...+80	-40...+80	-40...+80	-40...+80
IP 20	IP 20	IP 20	IP 20	IP 20
1.02	0.63	0.6	3.50	1.02
100 (3.5)	135 (4.8)	200 (7.1)	100 (3.5)	100 (3.5)
Green	Green	Green	Green	Green
M3.5 or equivalent	M3.5 or equivalent	M3.5 or equivalent	M3.5 or equivalent	M3.5 or equivalent
M4 or equivalent	M4 or equivalent	M4 or equivalent	M4 or equivalent	M4 or equivalent
1.0	1.0	1.0	1.0	1.0

Class 6 Solid State Relays/SPST-NO, SPST-NC, DPST-NO, 10-125 Amp Rating *continued*



NEW
NEW
NEW
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NEW



General Specifications (@ 25° C) (UL 508)

		New Part # Superceding Part #	Units	6250AXXSZS-DC3	6275AXXSZS-DC3
Output Characteristics				6250DSX-1	6275DSX-1
Number and type of Contacts				SPST-NO	SPST-NO
Switching Device				SCR (2)	SCR (2)
Current rating		A		50	75
Switching voltage		V		24....280 AC	24....280 AC
Switching Type				Zero Cross	Zero Cross
Maximum Rate of Rise Off State Voltage (dv/dt)		V/us		500	500
Incandescent Lamp Ampere Rating (rms)		A		39	39
Motor Load Rating (rms)		A		14	25
Min. Load current to maintain on		mA		250	250
Non-Repetitive Surge Current (1 cycle)		A		520	1150
Max. RMS overload current (1 second)		A		100	150
Max. Off state leakage current (rms)		mA		8	10
Peak Blocking Voltage		Vpk		600	600
Typical On State Voltage Drop (rms)		V		1.8	1.8
Max. On State Voltage Drop (rms)		V		1.8	1.8
Maximum I ² T for Fusing (A ²)				1250	5000
Input Characteristics					
Voltage Range		V		3....32	3....32
Must Release Voltage		V		1 DC	1 DC
Nominal Input Impedance		Ω		Current Regulator	Current Regulator
Typical Input Current @ 5VDC or 240VAC		mA		16	16
Reverse Polarity Protection				Yes	Yes
Performance Characteristics					
Operating Time (response time)	On	ms		8.3	8.3
	Off	ms		8.3	8.3
Rated Insulation Voltage		V		4000 AC	4000 AC
Dielectric strength		V		4000 AC	4000 AC
Environment					
Product certifications		Standard version		UR, CSA, CE	UR, CSA, CE
Ambient air temperature around the device	Storage	°C		-40...+100	-40...+100
	Operation	°C		-40...+80	-40...+80
Degree of protection				IP 20	IP 20
Miscellaneous Characteristics					
Thermal Resistance (Junction to Case)		°C/W		0.63	0.6
Weight		g (oz)		135 (4.8)	200 (7.1)
LED				Green	Green
Input Terminals				M3.5 or equivalent	M3.5 or equivalent
Output Terminals				M4 or equivalent	M4 or equivalent
Mounting Screw Torque		Nm		1.0	1.0



**Thermal Pad
(SSR-TP-1)**
Section 3 p.21



**Blade Terminals
DPST-NO**



**Heat Sink
(SSR-HS-1)**
Section 3 p.20

6210AXXTZS-DC3	6425BXXTZB-DC3*	6312AXXMDS-DC3	6325AXXMDS-DC3	6340AXXMDS-DC3
6210DTX-1	6425DTX-3*	6212DDX-1	6225DDX-1	6240DDX-1
SPST-NO	DPST-NO	SPST-NO	SPST-NO	SPST-NO
Triac	Alternistor	MOSFET	MOSFET	MOSFET
10	25	12	25	40
24....280 AC	48....480 AC	3....200 DC	3....200 DC	3....200 DC
Zero Cross	Zero Cross	DC Switching	DC Switching	DC Switching
250	250	N/A	N/A	N/A
16	N/A	N/A	N/A	N/A
8	N/A	N/A	N/A	N/A
120	80	20	20	20
250	250	27	50	90
80	80	N/A	N/A	N/A
10	10	8	8	8
300	300			
1.6	1.1	1.6	1.6	1.6
1.6	1.6	2.83	2.83	2.83
300	200	N/A	N/A	N/A
3....32	3.5....32	3....32	3....32	3....32
1 DC	1 DC	1 DC	1 DC	1 DC
1.5 K	Current Regulator	1K	1K	1K
2	16	10	10	10
Yes	Yes	No	No	No
8.3	8.3	300 μs	600 μs	600 μs
8.3	8.3	1	2.6	2.6
4000 AC	4000 AC	4000 AC	4000 AC	4000 AC
4000 AC	4000 AC	2500 AC	2500 AC	2500 AC
UR, CSA, CE	UR, CSA, CE	UR, CSA, CE	UR, CSA, CE	UR, CSA, CE
-40...+100	-40...+100	-40...+100	-40...+100	-40...+100
-40...+80	-40...+80	-40...+80	-40...+80	-40...+80
IP 20	IP 20	IP 20	IP 20	IP 20
1.45	1.20	1.06	1.06	1.06
100 (3.5)	100 (3.5)	110 (3.9)	135 (4.8)	135 (4.8)
Green	Green	Green	Green	Green
M3.5 or equivalent	0.187" QC	M3.5 or equivalent	M3.5 or equivalent	M3.5 or equivalent
M4 or equivalent	0.250" QC	M4 or equivalent	M4 or equivalent	M4 or equivalent
1.0	1.0	1.0	1.0	1.0

*Blade Terminal

Class 6 Solid State Relays/SPST-NO, SPST-NC, DPST-NO, 10-125 Amp Rating *continued*



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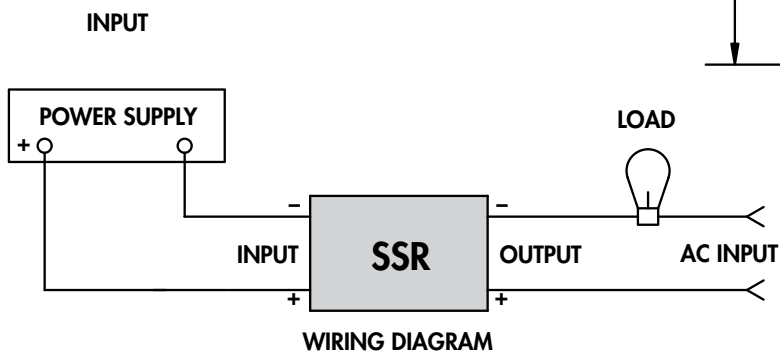
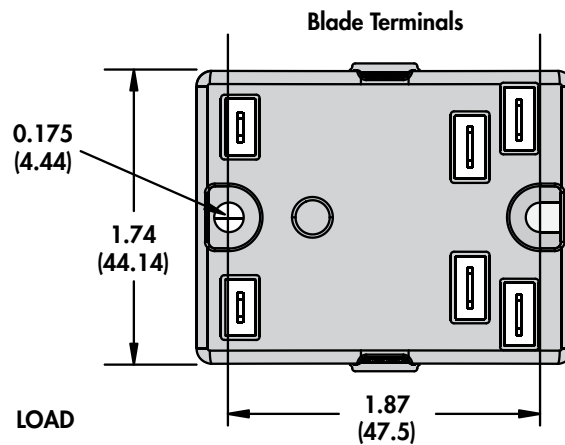
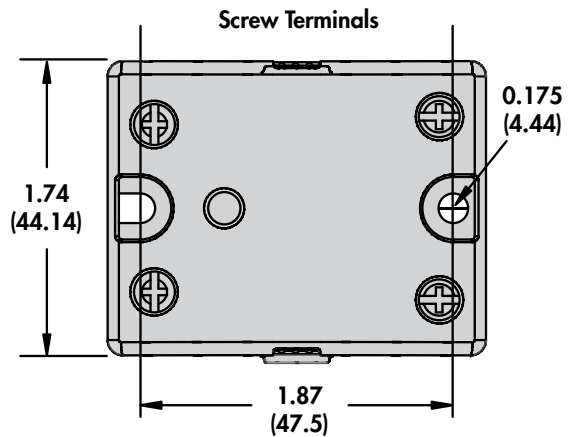
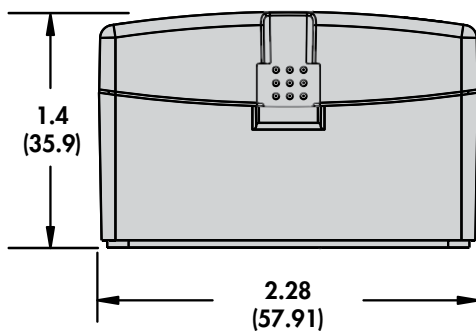
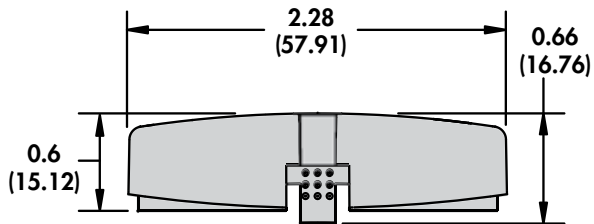


Screw Terminals
SPST-NO



Blade Terminals
DPST-NO

*Finger-safe safety cover is available for products up to 40 Amps.



Heat Sink/Class 6 SSR Relay

Thermal management is a fundamental consideration in the design and use of Solid State Relays (SSRs) because of the contact dissipation (typically 1 W per amp). It is, therefore, vital that sufficient heat sinking is provided, or the life and switching reliability of the SSR will be compromised. The unique design of the Magnecraft aluminum heat sink maximizes heat dissipation. This heat sink is available for Magnecraft's panel mount SSRs and ensures reliable operation when properly selected for the specific application. For ease of installation, all mounting holes are pre-drilled and tapped.

Optional Thermal Pad (SSR-TP-1)

See Section 3 p.21



Optional Heat Sink (SSR-HS-1)

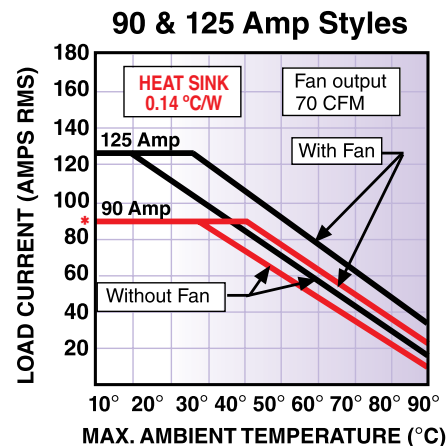
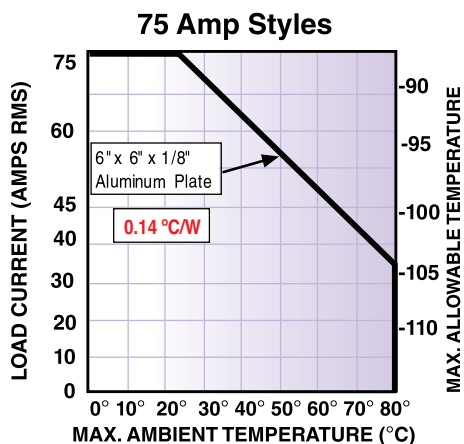
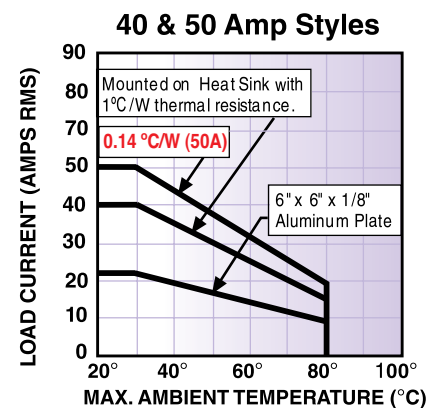
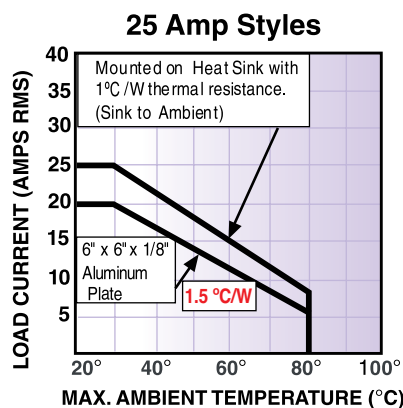
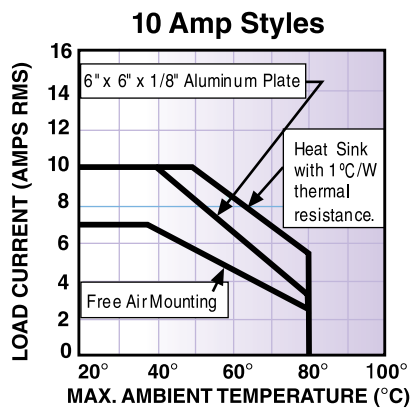
See Section 3 p.20



User Guide:

The Magnecraft SSR should be firmly mounted on a clean, smooth heat sink surface using thermally conductive or suitable thermal transfer pads.

- The Magnecraft heat sink matches heat dissipation requirements for Magnecraft 6 Series SSRs; up to 50 amps.
- The Magnecraft heat sink design achieves outstanding thermal efficiency.
- The Magnecraft heat sink is pre-drilled and tapped to suit the Magnecraft SSR 6 Series "hockey puck style" range.



* De-rating curve without fan.

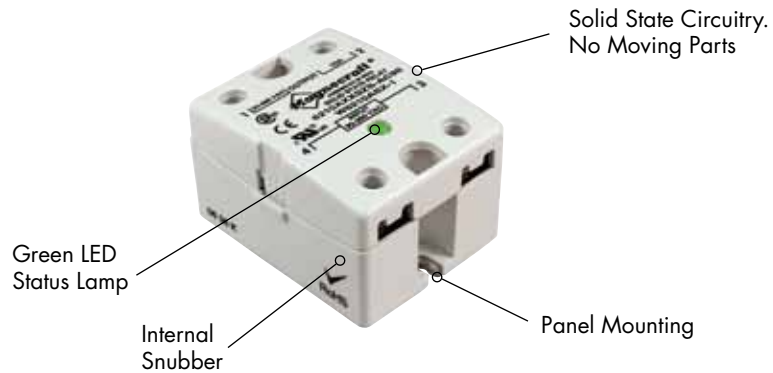
Class 6 Solid State Relays/SPST-NO, SPST-NC, DPST-NO, 10-125 Amp Rating *continued*



UL
UL Recognized
File No. E258297



**NEW
NEW
NEW
NEW
NEW**



Standard Part Numbers

BOLD-FACED PART NUMBERS ARE NORMALLY STOCKED

AC Operated, DUAL MARKED		Input Voltage Range	Output Voltage Range	Contact Configuration	Switching Type	Rated Current Load (Amps)
New Part #	Supersedes	SCR Output				
6210AXXSZS-AC90	W6210ASX-1	90....280 VAC	24....280 VAC	SPST-NO	Zero Cross	10
6225AXXSZS-AC90	W6225ASX-1	90....280 VAC	24....280 VAC	SPST-NO	Zero Cross	25
6240AXXSZS-AC90	W6240ASX-1	90....280 VAC	24....280 VAC	SPST-NO	Zero Cross	40
6250AXXSZS-AC90**	W6250ASX-1	90....280 VAC	24....280 VAC	SPST-NO	Zero Cross	50
6275AXXSZS-AC90**	W6275ASX-1	90....280 VAC	24....280 VAC	SPST-NO	Zero Cross	75
6410AXXSZS-AC90	W6410ASX-1	90....280 VAC	48....480 VAC	SPST-NO	Zero Cross	10
6425AXXSZS-AC90	W6425ASX-1	90....280 VAC	48....480 VAC	SPST-NO	Zero Cross	25
6440AXXSZS-AC90	W6440ASX-1	90....280 VAC	48....480 VAC	SPST-NO	Zero Cross	40
6450AXXSZS-AC90**	W6450ASX-1	90....280 VAC	48....480 VAC	SPST-NO	Zero Cross	50
6475AXXSZS-AC90**	W6475ASX-1	90....280 VAC	48....480 VAC	SPST-NO	Zero Cross	75
6690AXXSZS-AC90**	W6690ASX-1	90....280 VAC	48....600 VAC	SPST-NO	Zero Cross	90
66125AXXSZS-AC90**	W66125ASX-1	90....280 VAC	48....600 VAC	SPST-NO	Zero Cross	125
DC Operated, DUAL MARKED						
New Part #	Supersedes	SCR Output				
6210AXXSZS-DC3	W6210DSX-1	3....32 VDC	24....280 VAC	SPST-NO	Zero Cross	10
6225AXXSZS-DC3	W6225DSX-1	3....32 VDC	24....280 VAC	SPST-NO	Zero Cross	25
6240AXXSZS-DC3	W6240DSX-1	3....32 VDC	24....280 VAC	SPST-NO	Zero Cross	40
6250AXXSZS-DC3**	W6250DSX-1	3....32 VDC	24....280 VAC	SPST-NO	Zero Cross	50
6275AXXSZS-DC3**	W6275DSX-1	3....32 VDC	24....280 VAC	SPST-NO	Zero Cross	75
6410AXXSZS-DC3	W6410DSX-1	3....32 VDC	48....480 VAC	SPST-NO	Zero Cross	10
6425AXXSZS-DC3	W6425DSX-1	3....32 VDC	48....480 VAC	SPST-NO	Zero Cross	25
6440AXXSZS-DC3	W6440DSX-1	3....32 VDC	48....480 VAC	SPST-NO	Zero Cross	40
6450AXXSZS-DC3**	W6450DSX-1	3....32 VDC	48....480 VAC	SPST-NO	Zero Cross	50
6475AXXSZS-DC3**	W6475DSX-1	3....32 VDC	48....480 VAC	SPST-NO	Zero Cross	75
6690AXXSZS-DC3**	W6690DSX-1	3....32 VDC	48....600 VAC	SPST-NO	Zero Cross	90
66125AXXSZS-DC3**	W66125DSX-1	3....32 VDC	48....600 VAC	SPST-NO	Zero Cross	125
DC Operated, DUAL MARKED						
New Part #	Supersedes	TRIAC Output				
6210AXXTZS-DC3	W6210DTX-1	3....32 VDC	24....280 VAC	SPST-NO	Zero Cross	10
6225AXXTZS-DC3	W6225DTX-1	3....32 VDC	24....280 VAC	SPST-NO	Zero Cross	25
6240AXXTZS-DC3	W6240DTX-1	3....32 VDC	24....280 VAC	SPST-NO	Zero Cross	40
6210BXXTZB-DC3	W6210DTX-3	3....32 VDC	24....280 VAC	DPST-NO	Zero Cross	10
6210XXATRS-DC3	W6210DTX-4	3....32 VDC	24....280 VAC	SPST-NC	Random	10
6225XXATRS-DC3	W6225DTX-4	3....32 VDC	24....280 VAC	SPST-NC	Random	25
6240XXATRS-DC3	W6240DTX-4	3....32 VDC	24....280 VAC	SPST-NC	Random	40
6410AXXTZS-DC3	W6410DTX-1	3....32 VDC	48....480 VAC	SPST-NO	Zero Cross	10
6425AXXTZS-DC3	W6425DTX-1	3....32 VDC	48....480 VAC	SPST-NO	Zero Cross	25
6440AXXTZS-DC3	W6440DTX-1	3....32 VDC	48....480 VAC	SPST-NO	Zero Cross	40
DC Operated, DUAL MARKED						
New Part #	Supersedes	MOSFET Output				
6312AXXMDS-DC3	W6212DDX-1	3....32 VDC	3....200 VDC	SPST-NO	Random	12
6325AXXMDS-DC3**	W6225DDX-1	3....32 VDC	3....200 VDC	SPST-NO	Random	25
6340AXXMDS-DC3**	W6240DDX-1	3....32 VDC	3....200 VDC	SPST-NO	Random	40

**Only Legacy (superseding) part is currently available.



**Thermal Pad
(SSR-TP-1)**
Section 3 p.21



**Blade Terminals
DPST-NO**



**Heat Sink
(SSR-HS-1)**
Section 3 p.20

Available Part Numbers (Non-Standard)

AC Operated (SCR Output)	DC Operated (SCR Output)	DC Operated (Triac Output)	DC Operated (MOSFET Output)
6210AXXSRS-AC90	6210AXXSRS-DC3	6210AXXTRS-DC3	6312AXXMDB-DC3
6210XXASRS-AC90	6210XXASRS-DC3	6210BXXTZB-DC3	6312AXXMDS-DC20
6225AXXSZS-AC90	6210AXXSZS-DC20	6225AXXTRS-DC3	6325BXXMDS-DC3
6225AXXSRS-AC90	6225AXXSRS-DC3	6225BXXTZB-DC3	6340BXXMDS-DC3
6225XXASRS-AC90	6225XXASRS-DC3	6225XXATRB-DC3	
6225AXXSZS-AC18	6225BXXSZB-DC4	6240AXXTZS-DC3	
6225BXXSZB-AC90	6225BXXSZB-DC3	6425AXXTZB-DC3	
6240AXXSRS-AC90	6225BXXSRB-DC4	6425BXXTZB-DC3	
6240XXASRS-AC90	6240AXXSRS-DC3	6440AXXTZB-DC3	
6240AXXSZS-AC18	6240XXASRS-DC3	6440BXXTZB-DC3	
6240BXXSZB-AC90	6240AXXSZB-DC3		
6250XXASRS-AC90	6240BXXSZB-DC4		
6250AXXSZS-AC18	6240BXXSZB-DC3		
6425BXXSZB-AC90	6240BXXSRB-DC4		
6440XXASRS-AC90	6250AXXSRS-DC3		
6440BXXSZB-AC90	6250XXASRS-DC3		
64125XXASRS-AC90	6425BXXSZB-DC3		
	6440BXXSZB-DC3		
	6450AXXSRS-DC3		
	6490AXXSRS-DC3		
	6650AXXSRS-DC3		
	6690AXXSRS-DC3		
	66125AXXSRS-DC3		

Part Number Builder

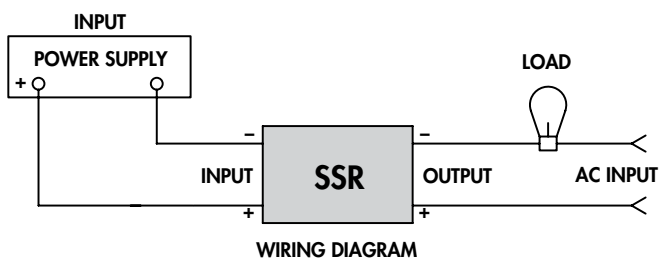
Series	Output Voltage	Output Current	Contact Config.	Output Type	Turn On Type	Connection Type	-	Input Voltage
6	1 = 2 to 60 VDC	07 = 7 AMPS	AXX = SPST-NO	S = SCR	Z = ZERO CROSS	S = SCREW TERMINALS		AC90 = 90 - 280 VAC
	2 = 24 to 280 VAC	10 = 10 AMPS	XXA = SPST-NC	T = STANDARD TRIAC	R = RANDOM	B = BLADE TERMINALS		AC18 = 18 - 28 VAC
	3 = 3 to 200 VDC	12 = 12 AMPS	BXX = DPST-NO	M = MOSFET	D = DC SWITCH			DC3 = 3 - 32 VDC
	4 = 48 to 480 VAC	25 = 25 AMPS	XXB = DPST-NC					DC4 = 4 - 15 VDC
	6 = 48 to 600 VAC	40 = 40 AMPS						DC20 = 20 - 50 VDC
		50 = 50 AMPS						
		75 = 75 AMPS						
		90 = 90 AMPS						
		100 = 100 AMPS						
		125 = 125 AMPS						

Note - Not all iterations of option codes are available.

Advantages of the 70S2 Series

Since acquiring this line of miniature SSRs from Grayhill, this product has continuously evolved both functionally and visually. The 70S2 Series relays are designed for medium-power loads. The design incorporates a triac output for AC loads and MOSFETs for DC loads. The 70S2 Series relays use optical isolation to protect the control from transients. The 70S2 compact package is available in a combination of screw, fast-on or PCB terminals. Its compact size makes it ideal for designs where space is limited. The 70S2 Series relays have excellent thermal performance.

- **Small Packages**
Ideal for Tight Designs..
- **Eight Different Packages**
Wide Choice of Design Options.
- **Optically Isolated**
Input Isolated from Output.
- **Zero Cross Switching**
Reduced Current Surges for Most Loads.
- **Internal Snubber**
Excellent Transient Protection.



- Switch up to 5 Amps
- Integrated Thermal Management
- PCB Mount



70S2 V (5 Amp)



70S2 V (3 Amp)



70S2 S

- Switch up to 12 Amps
- Blade Terminals
- Panel Mount



70S2 N



70S2 F

- Switch up to 4 Amps
- Solder Terminals
- PCB Mount

We're very pleased at the breadth of products and solutions we are able to offer engineers and designers. And this is just the beginning.

We will continue to develop high value products - with innovative features not offered anywhere else in the industry.



70S2 M

- Switch up to 10 Amps
- Solder Terminals
- PCB/Panel Mount



70S2 H

- Switch up to 2.5 Amps
- Solder Terminals
- PCB Mount



70S2 L

- Switch up to 6 Amps
- Solder Terminals
- PCB/Panel Mount



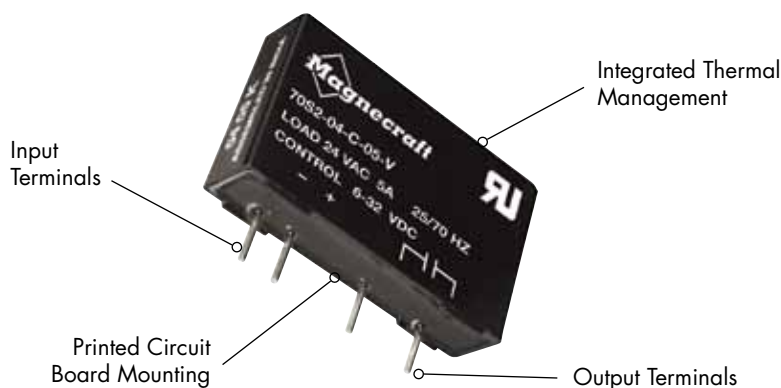
70S2 K

- Switch up to 4 Amps
- Socket Compatible

70S2 Series Solid State Relays/3, 5 Amp, V Style



UL Recognized
File No. E258297



General Specifications (@ 25° C) (UL 508)

Output characteristics		Units	70S2-01-A	70S2-01-E	70S2-02-A	70S2-02-E
Number and type of contacts			SPST-NO	SPST-NO	SPST-NO	SPST-NO
Switching device			MOSFET		MOSFET	
Current rating	A		3	5	3	5
Switching voltage	V		3 to 60 DC	4 to 20 AC	3 to 60 DC	4 to 20 AC
Switching type			DC Switching		DC Switching	
Maximum rate of rise off state voltage (dv/dt)	V/us		N/A		N/A	
Min. Load current to maintain on	mA		100		100	
Non-repetitive surge current (1 cycle)	A		5 (1 SEC)		6 (1 SEC)	
Max. Off state leakage current (rms)	mA		10 μ A		10 μ A	
Typical on state voltage drop (rms)	V		1.2 DC		1.2 DC	
Minimum peak blocking voltage	V		105 DC		105 DC	
Input characteristics						
Voltage range	V		3 to 15 DC	3 to 15 DC	9 to 30 DC	9 to 30 DC
Must release voltage	V		1 DC	1 DC	1 DC	1 DC
Typical input current @ 5 VDC or 240 VAC	mA		5 to 40		5 to 17	
Max. Reverse control voltage	V		3 DC	3 DC	3 DC	3 DC
Performance characteristics						
Operating time (response time)	On	ms	75 μ s		75 μ s	
	Off	ms	500 μ s		500 μ s	
Dielectric strength	Terminals to chassis	V	4000 AC	4000 AC	4000 AC	4000 AC
	Input to output	V	4000 AC	4000 AC	4000 AC	4000 AC
Environment						
Product certifications	Standard version		UR, CSA	UR, CSA	UR, CSA	UR, CSA
Ambient air temperature around the device	Storage	°C	-40 to +125	-40 to +125	-40 to +125	-40 to +125
	Operation	°C	-40 to +100	-40 to +100	-40 to +100	-40 to +100
Miscellaneous characteristics						
Thermal resistance (junction to case)	°C/W		0.5	0.5	0.5	0.5
Weight	g (oz)		25 (0.9)	25 (0.9)	25 (0.9)	25 (0.9)



70S2 V (3 Amp)

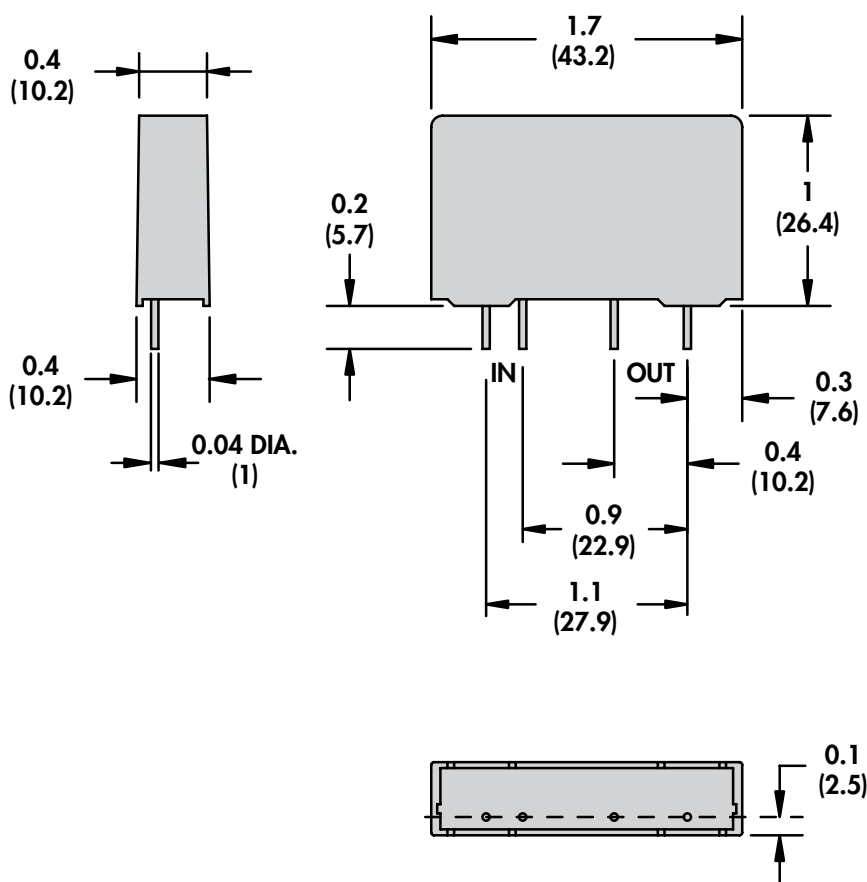
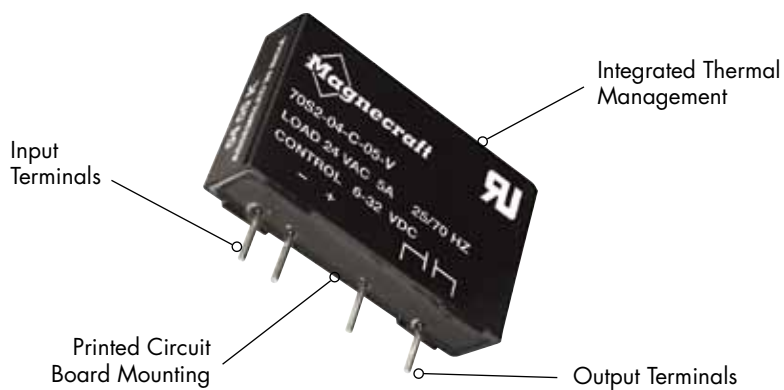


70S2 V (5 Amp)

NEW
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NEW

70S2-04-B	70S2-04-C	70S2-04-D	70S2-05-B	70S2-05-C	70S2-05-D
SPST-NO	SPST-NO	SPST-NO	SPST-NO	SPST-NO	SPST-NO
Triac	Triac	Triac	Triac	Triac	Triac
3/5	3/5	3/5	3	3	3
24 to 140 AC	24 to 280 AC	8 to 50 AC	24 to 140 AC	24 to 280 AC	8 to 50 AC
Zero Cross	Zero Cross	Zero Cross	Zero Cross	Zero Cross	Zero Cross
300	300	300	300	300	300
75 / 50	75 / 50	75 / 50	75	75	75
60 / 300	60 / 300	60 / 300	60	60	60
38512	38512	38420	6	6	3
1.6 AC	1.6 AC	1.6 AC	1.6 AC	1.6 AC	1.6 AC
400 AC	600 AC	200 AC	400 AC	600 AC	200 AC
3 to 32 DC	3 to 32 DC	3 to 32 DC	6 to 32 DC	6 to 32 DC	6 to 32 DC
1 DC	1 DC	1 DC	1 DC	1 DC	1 DC
1 to 19	1 to 19	1 to 19	1 to 6	1 to 6	1 to 6
3 DC	3 DC	3 DC	3 DC	3 DC	3 DC
8.3	8.3	8.3	8.3	8.3	8.3
8.3	8.3	8.3	8.3	8.3	8.3
4000 AC	4000 AC	4000 AC	4000 AC	4000 AC	4000 AC
4000 AC	4000 AC	4000 AC	4000 AC	4000 AC	4000 AC
UR, CSA	UR, CSA	UR, CSA	UR, CSA	UR, CSA	UR, CSA
-40 to +125	-40 to +125	-40 to +125	-40 to +125	-40 to +125	-40 to +125
-40 to +100	-40 to +100	-40 to +100	-40 to +100	-40 to +100	-40 to +100
0.5	0.5	0.5	0.5	0.5	0.5
25 (0.9)	25 (0.9)	25 (0.9)	25 (0.9)	25 (0.9)	25 (0.9)

70S2 Series Solid State Relays/3, 5 Amp, V Style *continued*





70S2 V (3 Amp)



70S2 V (5 Amp)

NEW
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NEW

Standard Part Numbers

BOLD-FACED PART NUMBERS ARE NORMALLY STOCKED

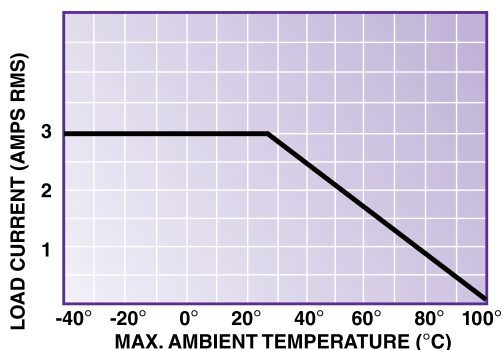
DC Operated	Input Voltage Range	Output Voltage Range	Contact Configuration	Switching Type	Rated Current Load
70S2-01-A-03-V	3 to 15 VDC	3 to 60 VDC	SPST-NO	MOSFET	3 A
70S2-01-E-05-V	3 to 15 VDC	4 to 200 VAC	SPST-NO	Zero Cross	5 A
70S2-02-A-03-V	9 to 30 VDC	3 to 60 VDC	SPST-NO	MOSFET	3 A
70S2-02-E-05-V	9 to 30 VDC	4 to 200 VAC	SPST-NO	Zero Cross	5 A
70S2-04-B-03-V	3 to 32 VDC	24 to 140 VAC	SPST-NO	Zero Cross	3 A
70S2-04-B-05-V	3 to 32 VDC	24 to 140 VAC	SPST-NO	Zero Cross	5 A
70S2-04-C-03-V	3 to 32 VDC	24 to 280 VAC	SPST-NO	Zero Cross	3 A
70S2-04-C-05-V	3 to 32 VDC	24 to 280 VAC	SPST-NO	Zero Cross	5 A
70S2-04-D-03-V	3 to 32 VDC	8 to 50 VAC	SPST-NO	Zero Cross	3 A
70S2-04-D-05-V	3 to 32 VDC	8 to 50 VAC	SPST-NO	Zero Cross	5 A
70S2-05-B-03-V	6 to 32 VDC	24 to 140 VAC	SPST-NO	Zero Cross	3 A
70S2-05-C-03-V	6 to 32 VDC	24 to 280 VAC	SPST-NO	Zero Cross	3 A
70S2-05-D-03-V	6 to 32 VDC	8 to 50 VAC	SPST-NO	Zero Cross	3 A

Part Number Builder

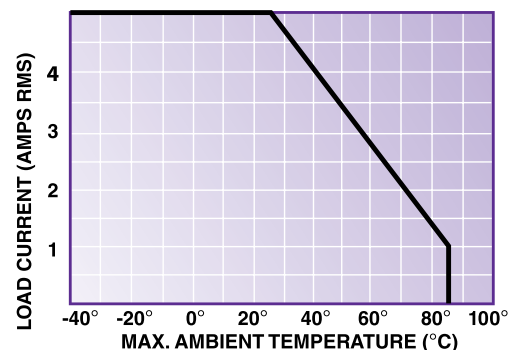
Series	Input Voltage	Output Voltage	Output Current	Package Style
70S2	01 = 3 to 15 VDC, DC/DC RELAYS	A = 3 to 60 VDC	02 = 2.5 AMPS	V = V STYLE
	02 = 9 to 30 VDC, DC/DC RELAYS	B = 24 to 140 VAC	03 = 3 AMPS	N = N STYLE
	03 = 3 to 30 VDC, 25 A S PACK	C = 24 to 280 VAC	04 = 4 AMPS	S = S STYLE
	04 = 3 to 30 VDC (OR 32 VDC), DC/AC RELAYS	D = 8 to 50 VAC	05 = 5 AMPS	F = F STYLE
	05 = 6 to 30 VDC (OR 32 VDC), DC/AC RELAYS	E = 4 to 200 VAC	06 = 6 AMPS	M = M STYLE
			10 = 10 AMPS	H = H STYLE
			12 = 12 AMPS	L = L STYLE
			25 = 25 AMPS	K = K STYLE

Maximum Continuous Current vs. Ambient Temperature

Style V, 3 Amp



Style V, 5 Amp



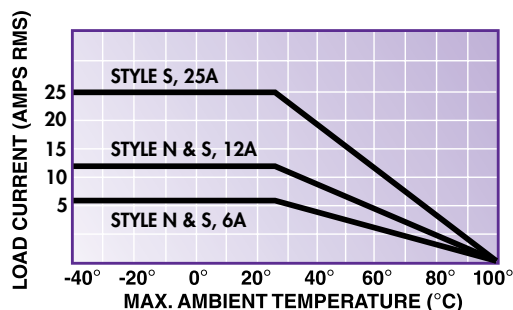
70S2 Series Solid State Relays/N and S Style



General Specifications (@ 25° C) (UL 508)

Output Characteristics		Units	70S2-04-B	70S2-05-B	70S2-04-C
Number and type of Contacts			SPST-NO	SPST-NO	SPST-NO
Switching Device			Triac	Triac	Triac
Current Rating	A		6 / 12	6 / 12	6 / 12
Switching voltage	V		24....140 AC	24....140 AC	24....280 AC
Switching Type			Zero Cross	Zero Cross	Zero Cross
Maximum Rate of Rise Off State Voltage (dv/dt)	V/us		300	300	300
Min. Load current to maintain on	mA		75 / 100	75 / 100	75 / 100
Non-Repetitive Surge Current (1 cycle)	A		60 / 150	60 / 150	60 / 150
Max. Off state leakage current (rms)	mA		6	6	6
Typical On State Voltage Drop (rms)	V		1.6 AC	1.6 AC	1.6 AC
Minimum Peak Blocking Voltage	V		400 AC	400 AC	600 AC
Input Characteristics					
Voltage Range	V		3....30 DC	6....30 DC	3....30 DC
Must Release Voltage	V		1 DC	1 DC	1 DC
Typical Input Current @ 5VDC or 240VAC	mA		7....16	6....10	7....16
Max. Reverse Control Voltage	V		3 DC	3 DC	3 DC
Performance Characteristics					
Operating time (response time)	On	ms	8.3	8.3	8.3
	Off	ms	8.3	8.3	8.3
Dielectric strength	Terminals to Chassis	V	3000 AC	3000 AC	3000 AC
	Input to Output	V	3000 AC	3000 AC	3000 AC
Environment					
Product certifications	Standard version		UR, CSA	UR, CSA	UR, CSA
Ambient air temperature around the device	Storage	°C	-40...+125	-40...+125	-40...+125
	Operation	°C	-40...+100	-40...+100	-40...+100
Miscellaneous Characteristics					
Thermal Resistance (Junction to Case)		°C/W	4	4	4
Weight		g (oz)	47 (1.7)	47 (1.7)	47 (1.7)
Mounting Screw Torque		Nm	1.0	1.0	1.0

Maximum Continuous Current vs. Ambient Temperature





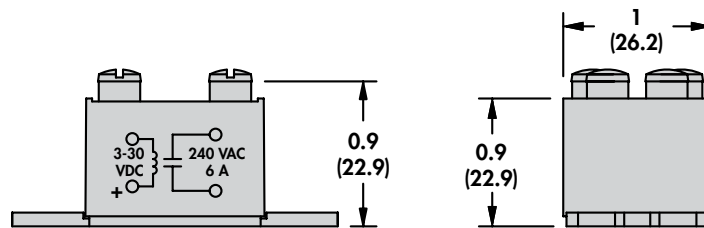
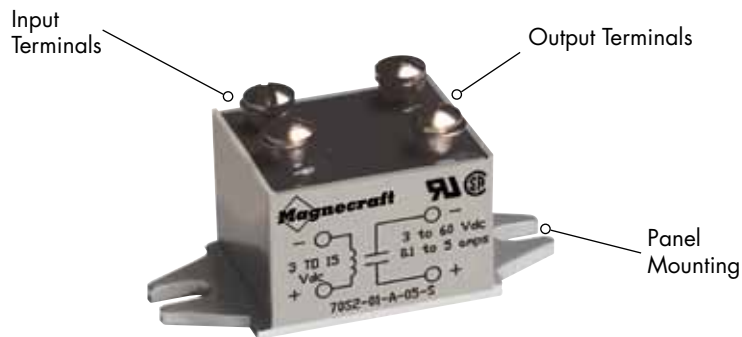
70S2 N



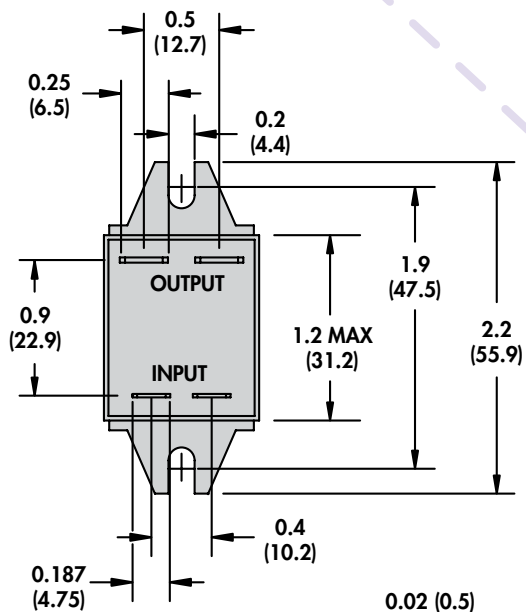
70S2 S

70S2-05-C	70S2-03-B	70S2-03-C	70S2-01-A	70S2-02-A
SPST-NO	SPST-NO	SPST-NO	SPST-NO	SPST-NO
Triac	Triac	Triac	MOSFET	MOSFET
6 / 12	25	25	5	5
24....280 AC	24....140 AC	24....280 AC	3....60 DC	3....60 DC
Zero Cross	Zero Cross	Zero Cross	DC Switching	DC Switching
300	300	300	N/A	N/A
75 / 100	100	100	100	100
60 / 150	300	300	7 (1 SEC)	7 (1 SEC)
6	6	6	10 μ A	10 μ A
1.6 AC	1.7 AC	1.7 AC	1.85 DC	1.85 DC
600 AC	400 AC	600 AC	105 DC	105 DC
6....30 DC	3....30 DC	3....30 DC	3....15 DC	9....30 DC
1 DC	1 DC	1 DC	1 DC	1 DC
6....10	7....16	6....10	5....40	5....17
3 DC	3 DC	3 DC	3 DC	3 DC
8.3	8.3	8.3	75 μ s	75 μ s
8.3	8.3	8.3	750 μ s	750 μ s
3000 AC	3000 AC	3000 AC	2500 AC	2500 AC
3000 AC	3000 AC	3000 AC	2500 AC	2500 AC
UR, CSA	UR, CSA	UR, CSA	UR, CSA	UR, CSA
-40...+125	-40...+125	-40...+125	-40...+125	-40...+125
-40...+100	-40...+100	-40...+100	-40...+100	-40...+100
4	4	4	4	4
47 (1.7)	47 (1.7)	47 (1.7)	47 (1.7)	35 (1.2)
1.0	1.0	1.0	1.0	1.0

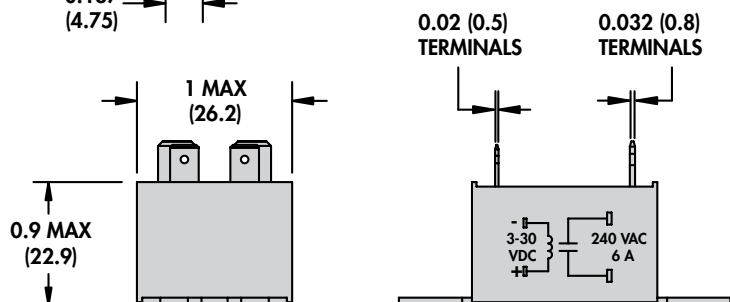
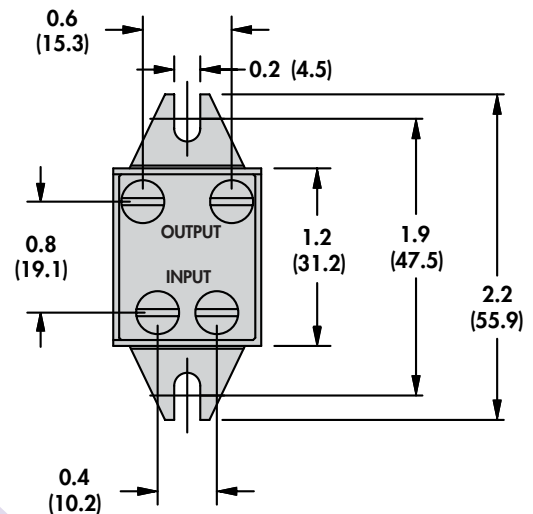
70S2 Series Solid State Relays/N and S Style *continued*



70S2 S



70S2 N





70S2 N



70S2 S

Standard Part Numbers

BOLD-FACED PART NUMBERS ARE NORMALLY STOCKED

DC Operated	Input Voltage Range	Output Voltage Range	Contact Configuration	Switching Type	Rated Current Load (Amps)
70S2-04-B-06-N	3....30 VDC	24....140 VAC	SPST-NO	Zero Cross	6
70S2-05-B-06-N	6....30 VDC	24....140 VAC	SPST-NO	Zero Cross	6
70S2-04-B-12-N	3....30 VDC	24....140 VAC	SPST-NO	Zero Cross	12
70S2-05-B-12-N	6....30 VDC	24....140 VAC	SPST-NO	Zero Cross	12
70S2-04-C-06-N	3....30 VDC	24....280 VAC	SPST-NO	Zero Cross	6
70S2-05-C-06-N	6....30 VDC	24....280 VAC	SPST-NO	Zero Cross	6
70S2-04-C-12-N	3....30 VDC	24....280 VAC	SPST-NO	Zero Cross	12
70S2-05-C-12-N	6....30 VDC	24....280 VAC	SPST-NO	Zero Cross	12
70S2-01-A-05-N	3....15 VDC	3....60 VDC	SPST-NO	DC Switching	5
70S2-04-B-06-S	3....30 VDC	24....140 VAC	SPST-NO	Zero Cross	6
70S2-05-B-06-S	6....30 VDC	24....140 VAC	SPST-NO	Zero Cross	6
70S2-04-B-12-S	3....30 VDC	24....140 VAC	SPST-NO	Zero Cross	12
70S2-05-B-12-S	6....30 VDC	24....140 VAC	SPST-NO	Zero Cross	12
70S2-03-B-25-S	3....30 VDC	24....140 VAC	SPST-NO	Zero Cross	25
70S2-04-C-06-S	3....30 VDC	24....280 VAC	SPST-NO	Zero Cross	6
70S2-05-C-06-S	6....30 VDC	24....280 VAC	SPST-NO	Zero Cross	6
70S2-04-C-12-S	3....30 VDC	24....280 VAC	SPST-NO	Zero Cross	12
70S2-05-C-12-S	6....30 VDC	24....280 VAC	SPST-NO	Zero Cross	12
70S2-03-C-25-S	3....30 VDC	24....280 VAC	SPST-NO	Zero Cross	25
70S2-01-A-05-S	3....15 VDC	3....60 VDC	SPST-NO	DC Switching	5
70S2-02-A-05-S	9....30 VDC	3....60 VDC	SPST-NO	DC Switching	5

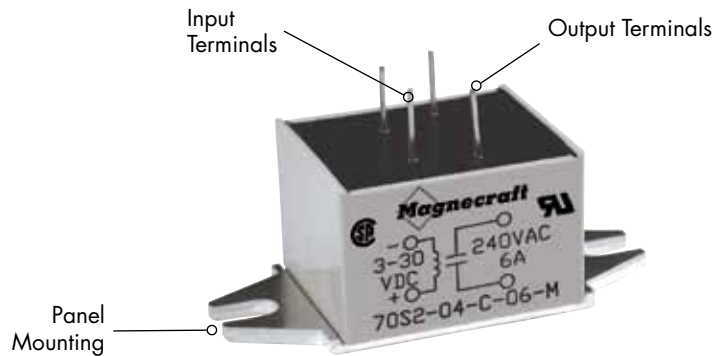
Part Number Builder

Series	Input Voltage	Output Voltage	Output Current	Package Style
70S2	01 = 3 to 15 VDC, DC/DC RELAYS	A = 3 to 60 VDC	02 = 2.5 AMPS	V = V STYLE
	02 = 9 to 30 VDC, DC/DC RELAYS	B = 24 to 140 VAC	03 = 3 AMPS	N = N STYLE
	03 = 3 to 30 VDC, 25 A S PACK	C = 24 to 280 VAC	04 = 4 AMPS	S = S STYLE
	04 = 3 to 30 VDC (OR 32 VDC), DC/AC RELAYS	D = 8 to 50 VAC	05 = 5 AMPS	F = F STYLE
	05 = 6 to 30 VDC (OR 32 VDC), DC/AC RELAYS		06 = 6 AMPS	M = M STYLE
			10 = 10 AMPS	H = H STYLE
			12 = 12 AMPS	L = L STYLE
			25 = 25 AMPS	K = K STYLE

70S2 Series Solid State Relays/F and M Style



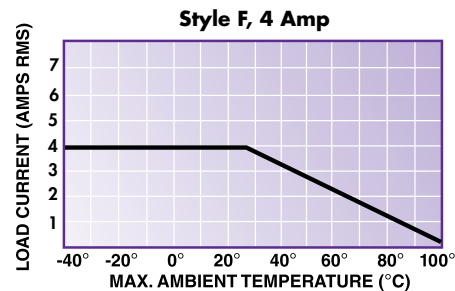
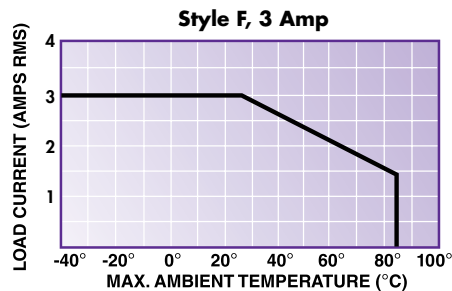
UL Recognized
File No. E258297



General Specifications (@ 25° C) (UL 508)

Output Characteristics		Units	70S2-04-B	70S2-05-B
Number and type of Contacts			SPST-NO	SPST-NO
Switching Device			Triac	Triac
Current Rating		A	4 6 10	4 6 10
Switching voltage		V	24....140 AC	24....140 AC
Switching Type			Zero Cross	Zero Cross
Maximum Rate of Rise Off State Voltage (dv/dt)		V/us	300	300
Min. Load current to maintain on		mA	75 100	75 100
Non-Repetitive Surge Current (1 cycle)		A	60 110	60 110
Max. Off state leakage current (rms)		mA	6	6
Typical On State Voltage Drop (rms)		V	1.6 AC	1.6 AC
Minimum Peak Blocking Voltage		V	400 AC	400 AC
Input Characteristics				
Voltage Range		V	3....30 DC	6....30 DC
Must Release Voltage		V	1 DC	1 DC
Typical Input Current @ 5VDC or 240VAC		mA	7....16	6....10
Max. Reverse Control Voltage		V	3 DC	3 DC
Performance Characteristics				
Operating time (response time)	On	ms	8.3	8.3
	Off	ms	8.3	8.3
Dielectric strength	Terminals to Chassis	V	3000 AC	3000 AC
	Input to Output	V	3000 AC	3000 AC
Environment				
Product certifications	Standard version		UR, CSA	UR, CSA
Ambient air temperature around the device	Storage	°C	-40...+125	-40...+125
	Operation	°C	-40...+100	-40...+100
Miscellaneous Characteristics				
Thermal Resistance (Junction to Case)		°C/W	4	4
Weight		g (oz)	35 (1.2)	35 (1.2)
Mounting Screw Torque		Nm	1.0	1.0

Maximum Continuous Current vs. Ambient Temperature



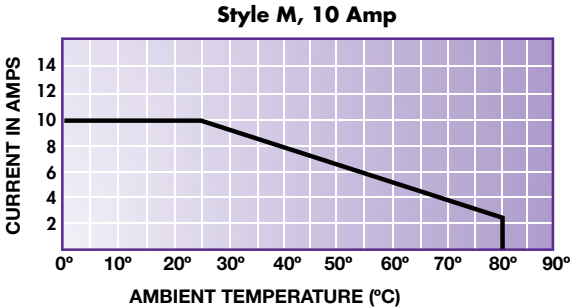
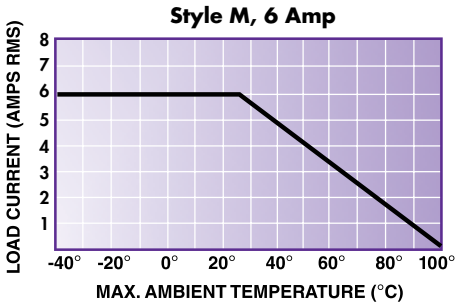


70S2 F

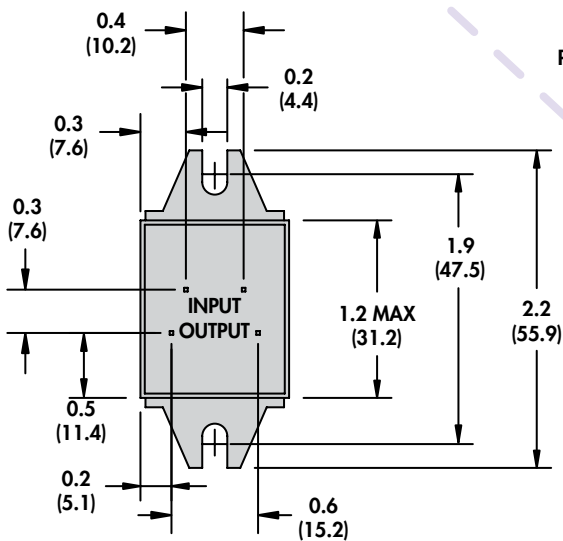
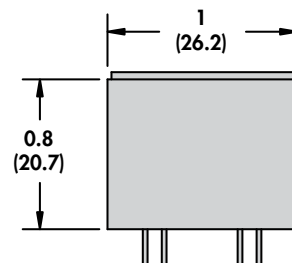
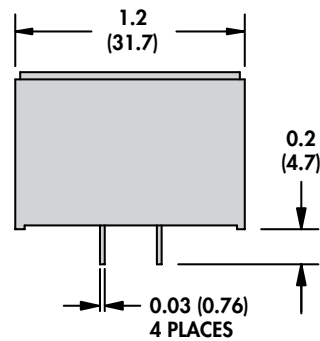
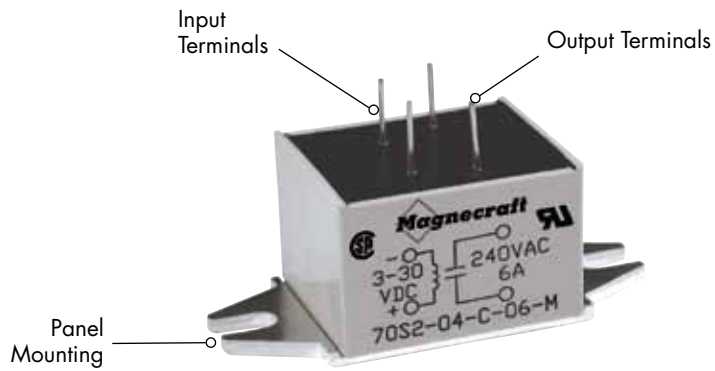


70S2 M

70S2-04-C	70S2-05-C	70S2-01-A	70S2-02-A
SPST-NO	SPST-NO	SPST-NO	SPST-NO
Triac	Triac	MOSFET	MOSFET
4 6 10	4 6 10	3	3
24....280 AC	24....280 AC	3....60 DC	3....60 DC
Zero Cross	Zero Cross	DC Switching	DC Switching
300	300	N/A	N/A
75 100	75 100	100	100
60 110	60 110	N/A	N/A
6	6	10 μ A	10 μ A
1.6 AC	1.6 AC	1.2 DC	1.2 DC
600 AC	600 AC	105 DC	105 DC
3....30 DC	6....30 DC	3....15 DC	9....30 DC
1 DC	1 DC	1 DC	1 DC
7....16	6....10	5....40	5....17
3 DC	3 DC	3 DC	3 DC
8.3	8.3	75 μ s	75 μ s
8.3	8.3	500 μ s	500 μ s
3000 AC	3000 AC	2500 AC	2500 AC
3000 AC	3000 AC	2500 AC	2500 AC
UR, CSA	UR, CSA	UR, CSA	UR, CSA
-40...+125	-40...+125	-40...+125	-40...+125
-40...+100	-40...+100	-40...+100	-40...+100
4	4	4	4
35 (1.2)	35 (1.2)	35 (1.2)	35 (1.2)
1.0	1.0	1.0	1.0

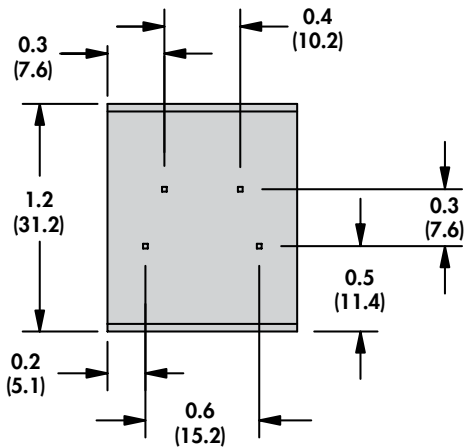


70S2 Series Solid State Relays/F and M Style *continued*

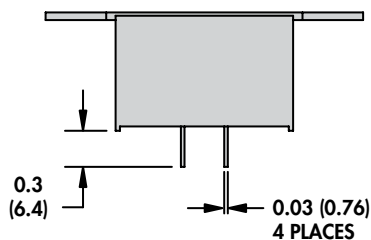
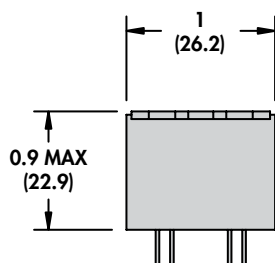


POTTING MIGRATION ON LEADS

70S2 F



70S2 M





70S2 F



70S2 M

Standard Part Numbers

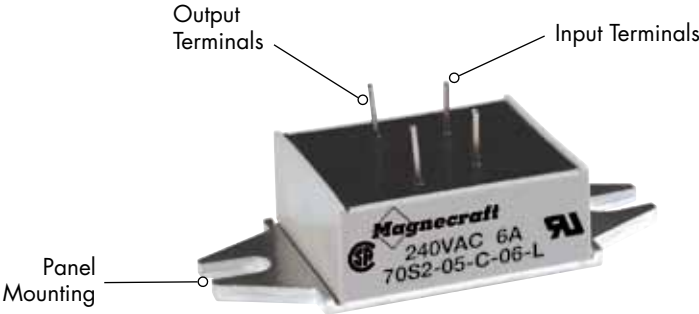
BOLD-FACED PART NUMBERS ARE NORMALLY STOCKED

DC Operated	Input Voltage Range	Output Voltage Range	Contact Configuration	Switching Type	Rated Current Load (Amps)
70S2-04-B-04-F	3...30 VDC	24...140 VAC	SPST-NO	Zero Cross	4
70S2-05-B-04-F	6...30 VDC	24...140 VAC	SPST-NO	Zero Cross	4
70S2-04-C-04-F	3...30 VDC	24...280 VAC	SPST-NO	Zero Cross	4
70S2-05-C-04-F	6...30 VDC	24...280 VAC	SPST-NO	Zero Cross	4
70S2-01-A-03-F	3...15 VDC	3...60 VDC	SPST-NO	DC Switching	3
70S2-02-A-03-F	9...30 VDC	3...60 VDC	SPST-NO	DC Switching	3
70S2-04-B-06-M	3...30 VDC	24...140 VAC	SPST-NO	Zero Cross	6
70S2-05-B-06-M	6...30 VDC	24...140 VAC	SPST-NO	Zero Cross	6
70S2-04-B-10-M	3...30 VDC	24...140 VAC	SPST-NO	Zero Cross	10
70S2-05-B-10-M	6...30 VDC	24...140 VAC	SPST-NO	Zero Cross	10
70S2-04-C-06-M	3...30 VDC	24...280 VAC	SPST-NO	Zero Cross	6
70S2-05-C-06-M	6...30 VDC	24...280 VAC	SPST-NO	Zero Cross	6
70S2-04-C-10-M	3...30 VDC	24...280 VAC	SPST-NO	Zero Cross	10
70S2-05-C-10-M	6...30 VDC	24...280 VAC	SPST-NO	Zero Cross	10

Part Number Builder

Series	Input Voltage	Output Voltage	Output Current	Package Style
70S2	01 = 3 to 15 VDC, DC/DC RELAYS	A = 3 to 60 VDC	02 = 2.5 AMPS	V = V STYLE
	02 = 9 to 30 VDC, DC/DC RELAYS	B = 24 to 140 VAC	03 = 3 AMPS	N = N STYLE
	03 = 3 to 30 VDC, 25 A S PACK	C = 24 to 280 VAC	04 = 4 AMPS	S = S STYLE
	04 = 3 to 30 VDC (OR 32 VDC), DC/AC RELAYS	D = 8 to 50 VAC	05 = 5 AMPS	F = F STYLE
	05 = 6 to 30 VDC (OR 32 VDC), DC/AC RELAYS		06 = 6 AMPS	M = M STYLE
			10 = 10 AMPS	H = H STYLE
			12 = 12 AMPS	L = L STYLE
			25 = 25 AMPS	K = K STYLE

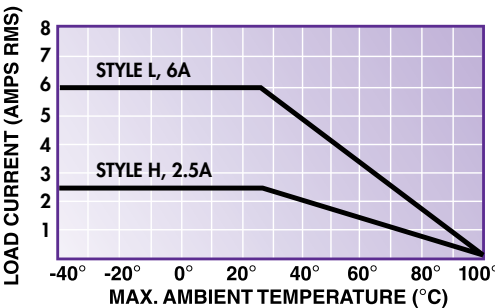
70S2 Series Solid State Relays/H and L Style



General Specifications (@ 25° C) (UL 508)

Output Characteristics		Units	70S2-04-D	70S2-05-D
Number and type of Contacts			SPST-NO	SPST-NO
Switching Device			Triac	Triac
Current Rating		A	2.5	2.5
Switching voltage		V	8....50 AC	8....50 AC
Switching Type			Zero Cross	Zero Cross
Maximum Rate of Rise Off State Voltage (dv/dt)		V/us	300	300
Min. Load current to maintain on		mA	75	75
Non-Repetitive Surge Current (1 cycle)		A	60	60
Max. Off state leakage current (rms)		mA	3	3
Typical On State Voltage Drop (rms)		V	1.6 AC	1.6 AC
Minimum Peak Blocking Voltage		V	200 AC	200 AC
Input Characteristics				
Voltage Range		V	3....30 DC	6....30 DC
Must Release Voltage		V	1 DC	1 DC
Typical Input Current @ 5VDC or 240VAC		mA	1....17	1....6
Max. Reverse Control Voltage		V	3 DC	3 DC
Performance Characteristics				
Operating time (response time)	On	ms	8.3	8.3
	Off	ms	8.3	8.3
Dielectric strength	Terminals to Chassis	V	2500 AC	2500 AC
	Input to Output	V	2500 AC	2500 AC
Environment				
Product certifications	Standard version		UR, CSA	UR, CSA
Ambient air temperature around the device	Storage	°C	-40...+125	-40...+125
	Operation	°C	-40...+100	-40...+100
Miscellaneous Characteristics				
Thermal Resistance (Junction to Case)		°C/W	3.5	3.5
Weight		g (oz)	22 (0.8)	22 (0.8)
Mounting Screw Torque		Nm	1.0	1.0

Maximum Continuous Current vs. Ambient Temperature





70S2 H



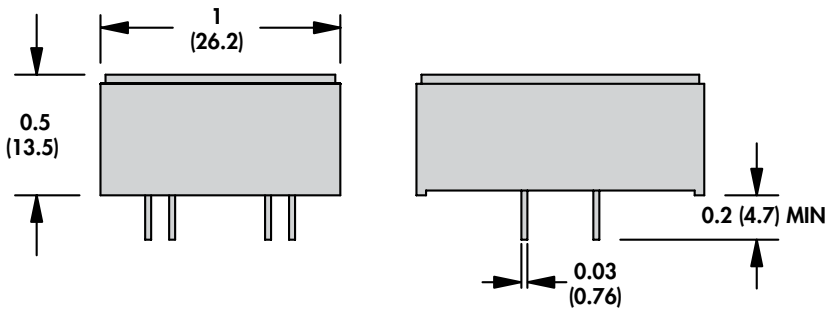
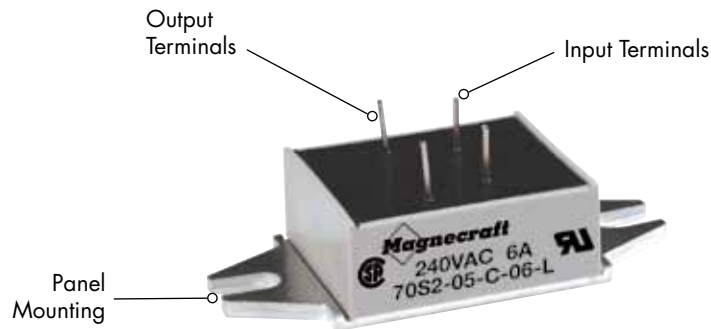
70S2 L

70S2-04-B	70S2-05-B	70S2-04-C	70S2-05-C
SPST-NO	SPST-NO	SPST-NO	SPST-NO
Triac	Triac	Triac	Triac
2.5 6	2.5 6	2.5 6	2.5 6
24....140 AC	24....140 AC	24....280 AC	24....280 AC
Zero Cross	Zero Cross	Zero Cross	Zero Cross
300	300	300	300
75	75	75	75
60	60	60	60
6	6	6	6
1.6 AC	1.6 AC	1.6 AC	1.6 AC
400 AC	400 AC	600 AC	400 AC
3....30 DC	6....30 DC	3....30 DC	6....30 DC
1 DC	1 DC	1 DC	1 DC
1....17	1....6	1....17	1....6
3 DC	3 DC	3 DC	3 DC
8.3	8.3	8.3	8.3
8.3	8.3	8.3	8.3
2500 AC	2500 AC	2500 AC	2500 AC
2500 AC	2500 AC	2500 AC	2500 AC
UR, CSA	UR, CSA	UR, CSA	UR, CSA
-40...+125	-40...+125	-40...+125	-40...+125
-40...+100	-40...+100	-40...+100	-40...+100
3.5	3.5	3.5	3.5
22 (0.8)	22 (0.8)	22 (0.8)	22 (0.8)
1.0	1.0	1.0	1.0

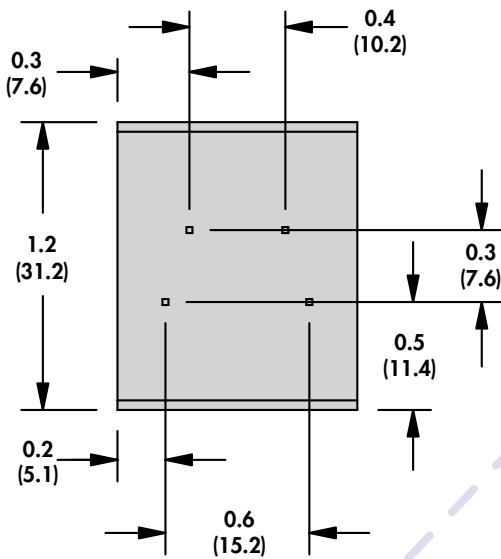
70S2 Series Solid State Relays/H and L Style *continued*



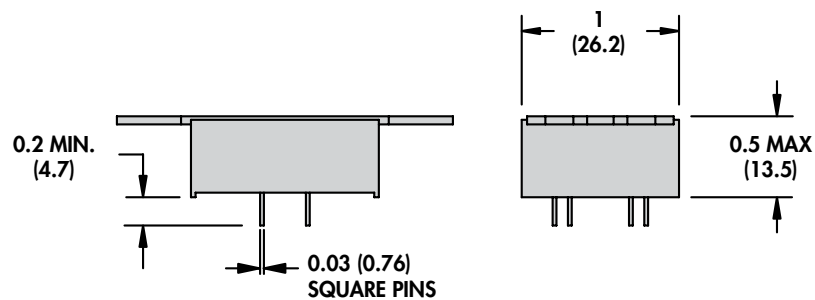
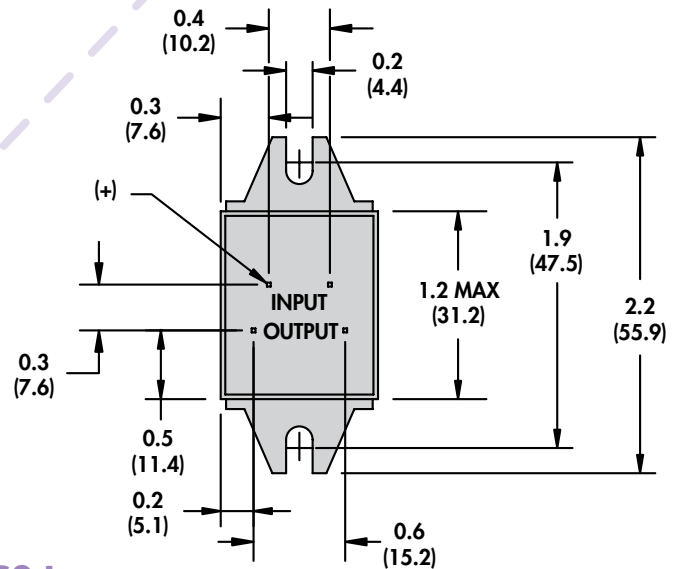
UL US



70S2 H



70S2 L





70S2 H



70S2 L

Standard Part Numbers

BOLD-FACED PART NUMBERS ARE NORMALLY STOCKED

DC Operated	Input Voltage Range	Output Voltage Range	Contact Configuration	Switching Type	Rated Current Load (Amps)
70S2-04-D-02-H	3....30 VDC	8....50 VAC	SPST-NO	Zero Cross	2.5
70S2-05-D-02-H	6....30 VDC	8....50 VAC	SPST-NO	Zero Cross	2.5
70S2-04-B-02-H	3....30 VDC	24....140 VAC	SPST-NO	Zero Cross	2.5
70S2-05-B-02-H	6....30 VDC	24....140 VAC	SPST-NO	Zero Cross	2.5
70S2-04-C-02-H	3....30 VDC	24....280 VAC	SPST-NO	Zero Cross	2.5
70S2-05-C-02-H	6....30 VDC	24....280 VAC	SPST-NO	Zero Cross	2.5
70S2-04-B-06-L	3....30 VDC	24....140 VAC	SPST-NO	Zero Cross	6
70S2-05-B-06-L	6....30 VDC	24....140 VAC	SPST-NO	Zero Cross	6
70S2-04-C-06-L	3....30 VDC	24....280 VAC	SPST-NO	Zero Cross	6
70S2-05-C-06-L	6....30 VDC	24....280 VAC	SPST-NO	Zero Cross	6

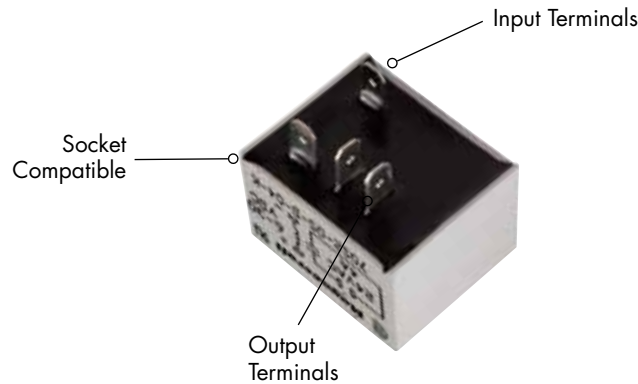
Part Number Builder

Series	Input Voltage	Output Voltage	Output Current	Package Style
70S2	01 = 3 to 15 VDC, DC/DC RELAYS	A = 3 to 60 VDC	02 = 2.5 AMPS	V = V STYLE
	02 = 9 to 30 VDC, DC/DC RELAYS	B = 24 to 140 VAC	03 = 3 AMPS	N = N STYLE
	03 = 3 to 30 VDC, 25 A S PACK	C = 24 to 280 VAC	04 = 4 AMPS	S = S STYLE
	04 = 3 to 30 VDC (OR 32 VDC), DC/AC RELAYS	D = 8 to 50 VAC	05 = 5 AMPS	F = F STYLE
	05 = 6 to 30 VDC (OR 32 VDC), DC/AC RELAYS		06 = 6 AMPS	M = M STYLE
			10 = 10 AMPS	H = H STYLE
			12 = 12 AMPS	L = L STYLE
			25 = 25 AMPS	K = K STYLE

70S2 Series Solid State Relays/K Style



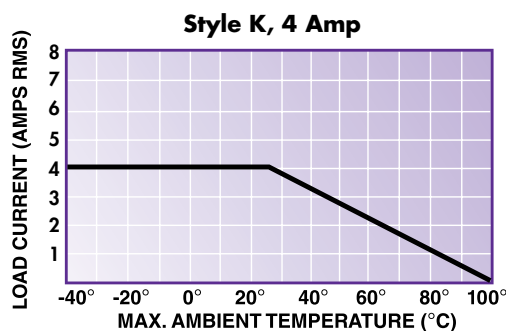
UL Recognized
File No. E258297



General Specifications (@ 25° C) (UL 508)

Output Characteristics		Units	70S2-04-B	70S2-04-C
Number and type of Contacts			SPST-NO	SPST-NO
Switching Device			Triac	Triac
Current Rating		A	4	4
Switching voltage		V	24....140 AC	24....280 AC
Switching Type			Zero Cross	Zero Cross
Maximum Rate of Rise Off State Voltage (dv/dt)		V/us	300	300
Min. Load current to maintain on		mA	75	75
Non-Repetitive Surge Current (1 cycle)		A	60	60
Max. Off state leakage current (rms)		mA	6	6
Typical On State Voltage Drop (rms)		V	1.6	1.6
Minimum Peak Blocking Voltage		V	400 AC	600 AC
Input Characteristics				
Voltage Range		V	3....30 DC	3....30 DC
Must Release Voltage		V	1 DC	1 DC
Typical Input Current @ 5VDC or 240VAC		mA	1....17	1....6
Max. Reverse Control Voltage		V	5 DC	5 DC
Performance Characteristics				
Operating time (response time)	On	ms	8.3	8.3
	Off	ms	8.3	8.3
Dielectric strength	Terminals to Chassis	V	3000 AC	3000 AC
	Input to Output	V	3000 AC	3000 AC
Environment				
Product certifications	Standard version		UR, CSA	UR, CSA
Ambient air temperature around the device	Storage	°C	-40...+125	-40...+125
	Operation	°C	-40...+100	-40...+100
Miscellaneous Characteristics				
Thermal Resistance (Junction to Case)		°C/W	1.5	1.5
Weight		g (oz)	40 (1.4)	40 (1.4)

Maximum Continuous Current vs. Ambient Temperature





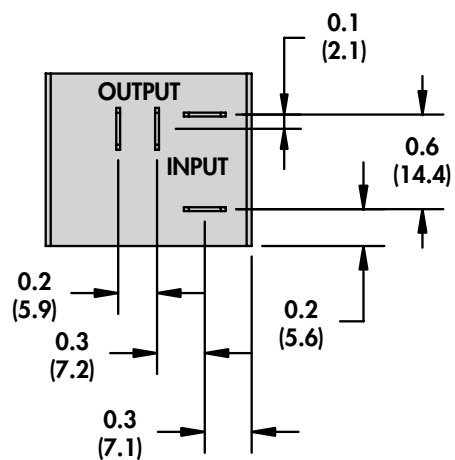
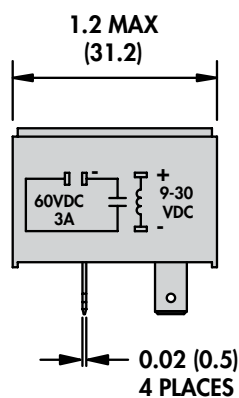
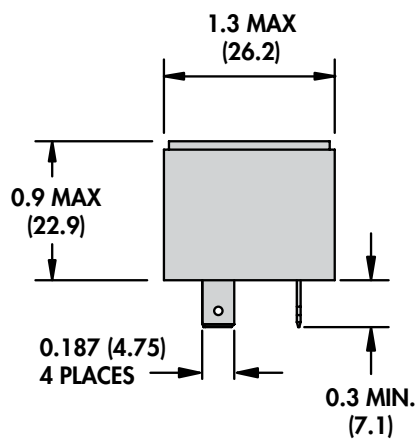
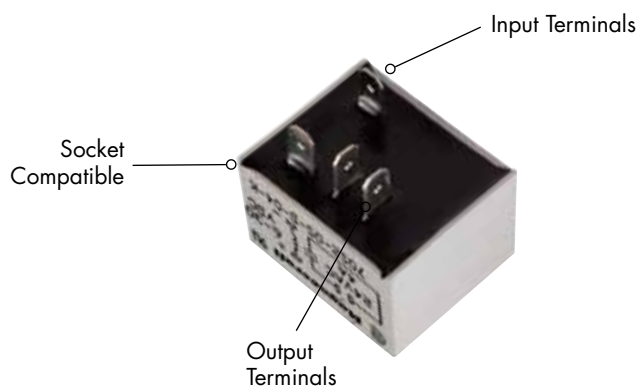
70S2 K Relay with the
70-459-1 Socket

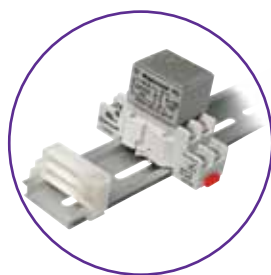


70S2 K

70S2-04-D	70S2-05-B	70S2-05-C	70S2-05-D	70S2-01-A	70S2-02-A
SPST-NO	SPST-NO	SPST-NO	SPST-NO	SPST-NO	SPST-NO
Triac	Triac	Triac	Triac	MOSFET	MOSFET
4	4	4	4	3	3
8....50 AC	24....140 AC	24....280 AC	8....50 AC	3....60 DC	3....60 DC
Zero Cross	Zero Cross	Zero Cross	Zero Cross	DC Switching	DC Switching
300	300	300	300	N/A	N/A
75	75	75	75	100	100
60	60	60	60	7 (1 SEC)	7 (1 SEC)
3	6	6	6	10 μ A	10 μ A
1.6	1.6	1.6	1.6	1.2	1.2
200 AC	400 AC	600 AC	200 AC	105 DC	105 DC
3....30 DC	6....30 DC	6....30 DC	6....30 DC	3....15	9....30
1 DC	1 DC	1 DC	1 DC	1 DC	1 DC
1....17	1....6	1....17	1....6	5....40	5....17
5 DC	5 DC	5 DC	5 DC	5 DC	5 DC
8.3	8.3	8.3	8.3	75 μ s	75 μ s
8.3	8.3	8.3	8.3	500 μ s	500 μ s
3000 AC	3000 AC	3000 AC	3000 AC	3000 AC	3000 AC
3000 AC	3000 AC	3000 AC	3000 AC	3000 AC	3000 AC
UR, CSA	UR, CSA	UR, CSA	UR, CSA	UR, CSA	UR, CSA
-40...+125	-40...+125	-40...+125	-40...+125	-40...+125	-40...+125
-40...+100	-40...+100	-40...+100	-40...+100	-40...+100	-40...+100
1.5	1.5	1.5	1.5	1.5	1.5
40 (1.4)	40 (1.4)	40 (1.4)	40 (1.4)	40 (1.4)	40 (1.4)

70S2 Series Solid State Relays/K Style *continued*





70S2 K Relay with the
70-459-1 Socket



70S2 K

Standard Part Numbers

BOLD-FACED PART NUMBERS ARE NORMALLY STOCKED

DC Operated	Input Voltage Range	Output Voltage Range	Contact Configuration	Switching Type	Rated Current Load (Amps)
70S2-04-B-04-K	3....30 VDC	24....140 VAC	SPST-NO	Zero Cross	4
70S2-04-C-04-K	3....30 VDC	24....280 VAC	SPST-NO	Zero Cross	4
70S2-04-D-04-K	3....30 VDC	8....50 VAC	SPST-NO	Zero Cross	4
70S2-05-B-04-K	6....30 VDC	24....140 VAC	SPST-NO	Zero Cross	4
70S2-05-C-04-K	6....30 VDC	24....280 VAC	SPST-NO	Zero Cross	4
70S2-05-D-04-K	6....30 VDC	8....50 VAC	SPST-NO	Zero Cross	4
70S2-01-A-03-K	3....15 VDC	3....60 VDC	SPST-NO	DC Switching	3
70S2-02-A-03-K	9....30 VDC	3....60 VDC	SPST-NO	DC Switching	3

Part Number Builder

Series	Input Voltage	Output Voltage	Output Current	Package Style
70S2	01 = 3 to 15 VDC, DC/DC RELAYS	A = 3 to 60 VDC	02 = 2.5 AMPS	V = V STYLE
	02 = 9 to 30 VDC, DC/DC RELAYS	B = 24 to 140 VAC	03 = 3 AMPS	N = N STYLE
	03 = 3 to 30 VDC, 25 A S PACK	C = 24 to 280 VAC	04 = 4 AMPS	S = S STYLE
	04 = 3 to 30 VDC (OR 32 VDC), DC/AC RELAYS	D = 8 to 50 VAC	05 = 5 AMPS	F = F STYLE
	05 = 6 to 30 VDC (OR 32 VDC), DC/AC RELAYS		06 = 6 AMPS	M = M STYLE
			10 = 10 AMPS	H = H STYLE
			12 = 12 AMPS	L = L STYLE
			25 = 25 AMPS	K = K STYLE

W226 Series Miniature Relay/SPST-NO, 7 Amp Rating



UL US
UL Recognized
File No. E258297

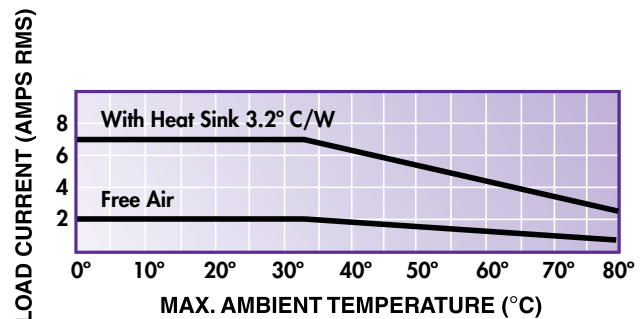


General Specifications (@ 25° C) (UL 508)

Output Characteristics		Standard	Units	226RE-7	226RE-8
Number and type of Contacts				SPST-NO	SPST-NO
Switching Device				Triac	Triac
Current Rating			A	7	7
Switching voltage			V	140 AC	280 AC
Switching Type				Zero Cross	Zero Cross
Maximum Rate of Rise Off State Voltage (dv/dt)			V/us	100	100
Min. Load current to maintain on			mA	50	50
Non-Repetitive Surge Current (1 cycle)			A	50	50
Max. Off state leakage current (rms)			mA	0.1	1.0
Typical On State Voltage Drop (rms)			V	1.8 AC	3.6 AC
Minimum Peak Blocking Voltage			V	260 AC	380 AC
Input Characteristics					
Voltage Range			V	5 12	5 12
Must Release Voltage			V	1.5 DC	1.5 DC
Typical Input Current @ 5VDC or 240VAC			mA	10	10
Performance Characteristics					
Operating time (response time)	On		ms	10	10
	Off		ms	60	60
Dielectric strength	Terminals to Chassis		V	2500 AC	2500 AC
	Input to Output		V	2500 AC	2500 AC
Environment					
Product certifications		Standard version		UR, CSA	UR, CSA
Ambient air temperature around the device	Storage		°C	-40...+100	-40...+100
	Operation		°C	-30...+80	-30...+80
Miscellaneous Characteristics					
Thermal Resistance (Junction to Case)			°C/W	3	3
Weight			g (oz)	13 (0.5)	13 (0.5)
Mounting Screw Torque			Nm	1.0	1.0

	MOLEX	WINCHESTER
18-22 AWG	02-06-1103	156-10185
24-30 AWG	02-06-1132	156-10245

Push-On Terminal Receptacles





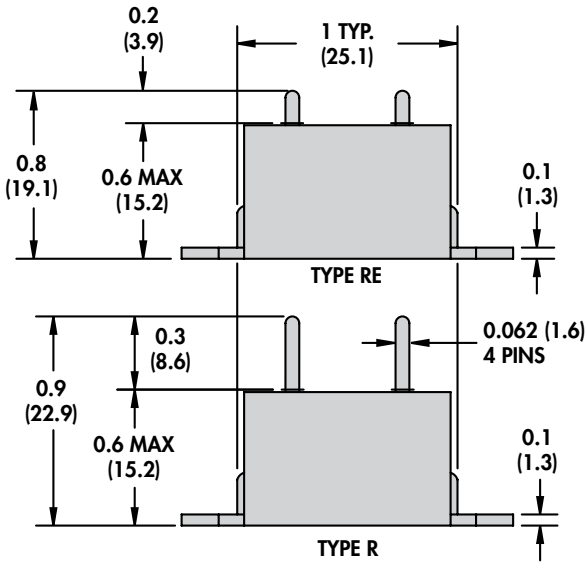
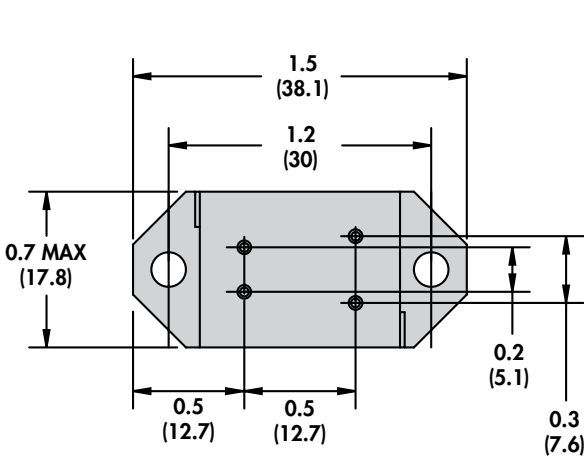
Standard Part Numbers

BOLD-FACED PART NUMBERS ARE NORMALLY STOCKED

DC Operated	Input Voltage Range	Output Voltage Range	Contact Configuration	Switching Type	Rated Current Load (Amps)
PUSH ON TERMINALS					
226R-7-5A1	5 VDC	140 VAC	SPST-NO	Zero Cross	7
226R-7-12A1	12 VDC	140 VAC	SPST-NO	Zero Cross	7
226R-8-5A1	5 VDC	280 VAC	SPST-NO	Zero Cross	7
226R-8-12A1	12 VDC	280 VAC	SPST-NO	Zero Cross	7
PCB TERMINALS					
226RE-7-5A1	5 VDC	140 VAC	SPST-NO	Zero Cross	7
226RE-7-12A1	12 VDC	140 VAC	SPST-NO	Zero Cross	7
226RE-8-5A1	5 VDC	280 VAC	SPST-NO	Zero Cross	7
226RE-8-12A1	12 VDC	280 VAC	SPST-NO	Zero Cross	7

Part Number Builder

Series	Terminal Style	–	Output Voltage	–	Input Voltage
226	R = PUSH ON TERMINALS RE = PCB TERMINALS		7 = 140 VAC 8 = 280 VAC		5A1 = 5 VDC 12A1 = 12 VDC



Section 4 Cross Reference Guide

Magnecraft	Supercedes Magnecraft	Potter & Brumfield	IDEC
6210AXXSZS-AC90	W6210ASX-1		RSSAN-10A
6225AXXSZS-AC90	W6225ASX-1	SSR240A25	RSSAN-25A
6240AXXSZS-AC90	W6240ASX-1		RSSAN-40A
6250AXXSZS-AC90	W6250ASX-1	SSR240A50	RSSAN-50A
6275AXXSZS-AC90	W6275ASX-1		RSSAN-75A
6410AXXSZS-AC90	W6410ASX-1		
6425AXXSZS-AC90	W6425ASX-1	SSR480A25	
6440AXXSZS-AC90	W6440ASX-1		
6450AXXSZS-AC90	W6450ASX-1	SSR480A50	RSSAN-50A
6475AXXSZS-AC90	W6475ASX-1		RSSAN-75A
6690AXXSZS-AC90	W6690ASX-1		RSSAN-90A
66125AXXSZS-AC90	W66125ASX-1	SSR480A125	
6210AXXSZS-DC3	W6210DSX-1		RSSDN-10A
6225AXXSZS-DC3	W6225DSX-1	SSR240D25	RSSDN-25A
6240AXXSZS-DC3	W6240DSX-1		
6250AXXSZS-DC3	W6250DSX-1	SSR240D50	RSSDN-50A
6275AXXSZS-DC3	W6275DSX-1		RSSDN-75A
6410AXXSZS-DC3	W6410DSX-1		RSSDN-10A
6425AXXSZS-DC3	W6425DSX-1	SSR480D25	RSSDN-25A
Magnecraft	Supercedes Magnecraft	Potter & Brumfield	IDEC
6440AXXSZS-DC3	W6440DSX-1		
6450AXXSZS-DC3	W6450DSX-1	SSR480D50	RSSDN-50A
6475AXXSZS-DC3	W6475DSX-1		RSSDN-75A
6690AXXSZS-DC3	W6690DSX-1		RSSDN-90A
66125AXXSZS-DC3	W66125DSX-1	SSR480D125	
6210AXXTZS-DC3	W6210DTX-1	SSRT240D10	
6225AXXTZS-DC3	W6225DTX-1	SSRT240D25	
6240AXXTZS-DC3	W6240DTX-1		
	W6410DTX-1		
	W6425DTX-1		
	W6440DTX-1		
6312AXXMDS-DC3	W6212DDX-1		
6325AXXMDS-DC3	W6225DDX-1		
6340AXXMDS-DC3	W6240DDX-1		



American Zettler	Carlo Gavazzi	Omron	Continental	Opto 22
	RA2410HA06	G3NA-210B	S505-OSJ610-009 S505-OSJ410-009	240A10
	RA2425HA06	G3NA-225B G3NA-240B	S505-OSJ625-009 S505-OSJ640-009	240A25
	RA2450HA06			240A45
			S505-OSJ675-009	
		G3NA-410B	S505-OSJ610-009	
		G3NA-425B	S505-OSJ625-009	
		G3NA-440B	S505-OSJ640-009	
			S505-OSJ675-009	
	RA2410-D06	G3NA-210B	S505-OSJ610-000 S505-OSJ410-000 SVDA 3V10	120D10 240D10
		G3NA-225B G3NA-240B	S505-OSJ625-000 S505-OSJ640-000	240D25
				240D45
			S505-OSJ675-000	
		G3NA-410B	S505-OSJ425-000	480D10-12
		G3NA-425B	S505-OSJ625-000	380D25 480D25-12
American Zettler	Carlo Gavazzi	Omron	Continental	Opto 22
		G3NA-440B	S505-OSJ640-000	
				380D45 480D45-12
			S505-OSJ675-000	
			S5DA-330-10-000	
SGX-1505FBD24Z10			S5DA-330-25-000	
SGX-1505FBD24Z25			RSDC-DC-112-000	
SGX-1505FBD24Z40				
SGX-1505FBD38P10				
SGX-1505FBD38P25				
SGX-1505FBD38P40				
		G3NA-D210B	RSDC-DC-120-000 RSDC-DC-140-000	

Section 4 Cross Reference Guide

Magnecraft	Carlo Gavazzi	Continental	Opto 22
SSR210DIN-AC	RN1A23A10U		
SSR225DIN-AC	RN1A23A20U		
SSR610DIN-AC	RN1A60A10U		
SSR625DIN-AC	RN1A60A20U	RSAA-660-25-1D0	
SSR210DIN-DC	RN1A23D10U		
SSR225DIN-DC	RN1A23D20U		
SSR610DIN-DC	RN1A60D10U		
SSR625DIN-DC	RN1A60D20U	RSDA-660-25-1D0	
70S2-01-A-03-V		ODC-05 ODC-15	DC60MP
70S2-02-A-03-V		ODC-24	
70S2-04-B-03-V		OAC-05 OAC-15 OAC-24	MP120D2 MP120D4
70S2-04-C-03-V		RP03-24 280-04A OAC-05A OAC-15A OAC-24A	MP240D2 MP120D4
Magnecraft	Carlo Gavazzi	Continental	Opto 22
70S2-04-C-12-N			Z240D10
70S2-05-C-12-N			
70S2-01-A-05-S			DC60S3 DC60S5
70S2-02-A-05-S			
70S2-03-B-25-S			
70S2-04-B-06-S			120D3
70S2-04-B-12-S			120D10
70S2-04-C-06-S			240D3
70S2-04-C-12-S		S505-OSJ610-000	240D10
70S2-03-C-25-S		S505-OSJ625-000	120D25 240D25



Potter & Brumfield	IDEC	Omron	American Zettler

Potter & Brumfield	IDEC	Omron	American Zettler

NOTES: