

# Soild State Relay

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Motor Drives



Power Quality



Power Supplies





#### **SOLID STATE RELAY** 固态继电器

#### **Features**

- Current:0.5A~400A
- Voltage:12V~680V
- Small General outline
- Vacuum Weld Techinics
- Led indicator showing "ON" or "OFF"
- Protect Panel
- IEC standard
- Input & output type could chose DC/AC AC/AC DC/DC

### Applications

- AC DC switch & Temp control
- Automate Control
- CNC machinery
- Packaging machinery
- Textile machinery
- Glass machinery
- Plastic machinery

#### Introduction

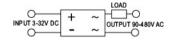
Solid State Relay(SSR) is industrial control appliances which use power semiconductor devices for main control part, compare with traditional magnetic contact industrial controllers, it is more high-powered, intelligent, digital, systematic and green development.

according switch mode SSR have zero-cross and random type. When the input control signal, random type conduction immediately, zero cross type need load voltage turn to zero region just can conduction. Revocation of the control signal, all can cut off when less than maintenance current. zero cross type may cause the maximum half-cycle delay, but reduces the impact of the load and radiofrequency interference, is the ideal switching devices.Random type fast response, suitable for dimmer, thermostats resistive loads and some inductive load applications.

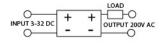
When the SSR turn off, if in the phase current and voltage have different, will have a large rise rate (dv/dt) on the triac, such as dv/dt higher than Triac standatrd (300V/us), will result in delay shutdown even failure. use antiparallel thyristor's SSR(powerful type) will been greatly improved at dv/dt(dv / dt is 500V/us). Therefore, in the field of capacitive load or inductive load, suggest the use powerful type SSR. Zenli's SSR are all powerful type.

Solid-state voltage regulator consists of thyristor switching circuit,resistance-capacitance phase shifting circuit,lag circuit and overvoltage absorption circuit. The use of only one external potentiometer can be used to achieve AC power regulation. In many occasions can replace the heavy contact voltage lighting power supply, voltage, temperature, brightness, s peed and other analog adjustment.

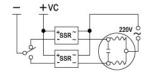
1. SSR-D(DC TO AC) Application Circuit



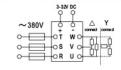
3. SSR-DD(DC to DC) Application Circuit



5. Motor positive and reverse Application Circult



6. 3phase SSR Load control Connect



### Ordering Information Table

Device Code SSR - D 48 40 R (1)

- -ZENLI Solid state relay
- 2 -D=DC to AC (DC3-32V) A=AC to AC DD=DC to DC V=Voltage regulator

HD=Industry standard DC/AC 3P=3-phase DC/AC

- 3 -Rated operational voltage, code × 10(48 × 10=480V)
- 4 -Rated operational current
- 5 -None=Zero cross trigger
  - -R=Random switch
- 6 -Outline: None=crydom type, black cover

1=FOTEK type, white cover 2=OMRON type, grey cover

固态继电器是以电力半导体器件为主功率器件的工业控 制电器,它与传统的电磁接触式工业控制器相比较,更符合电力 电气设备朝着高性能,智能化,数字化,系统化及绿色化发展的要 求。

固态继电器按照开关方式分为过零导通型和随机导通型。 当输入控制信号后,随机型能立即导通,过零型要等到负载电压 过零区域才能导通。撤销控制信号后,都在小于维持电流时关 断。过零型有可能造成最大半个周期的延时,却减小了对负载 的冲击和射频干扰,是理想的开关器件。随机性特点是反应快, 适合应用于调光调温等阻性负载和部分感性负载场合。

当SSR由导通到关断时,由于电流电压的相位不一致,将产 生一个很大的电压上升率(dv/dt)在双向可控硅上,如上升率超 过双向可控硅的换向dv/dt指标(标准为300V/us),将导致延时关 断甚至失败。由2只单向可控硅反并联构成的增强型SSR比普 通由1只双向可控硅构成的SSR的换向dv/dt有很大的提高(dv/dt 值为500V/us).因此在感性负载或容性负载领域建议选用增强型 SSR。我司的固态继电器均为增强型。

固态调压器由可控硅开关电路、阻容移相电路。滞后电路 和过压吸收电路等以模块的外形组成。使用时只需外接一个电 位器,就可以用来实现交流功率调节。在许多场合可以取代笨 重的接触式调压器, 广泛应用于包装机械、纺织机械、舞台照 明电源、电压、温度、亮度、速度等模拟调节。

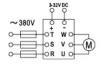
2. SSR-A(AC TO AC) Application Circuit



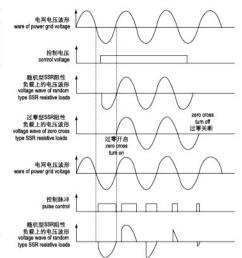
4. SSR-V(voltage regulator) Application Circuit

OUTPUT 200V AC

7. 3phase Motor positive and reverse



input para		neter 输入			output parameter 输出				Safe Load			
Specification	Control Control	Start Close	Operation	Operating Insulate	Inculato	Protection 保护		Resistive Load 阻性负载	Inductive Load 感性负载			
应用参数					urrent Current Voltage Current		Over Voltage			Over Current		
	DC/AC	3-32 V DC	<20mA	≥5mA	≤1.5VDC	10-120A	90-480V AC				60%	40%
Single Phase SSR	The Desire of the Section 1	90-280 V AC	<30mA	≥5mA	≤10VAC	10-120A	24-240V AC	VAL				
	Industry class	3-32 V DC	<20mA	≥5mA	≤1.5VDC	100-800A	90-480V AC					
	DC/DC	5-32 V DC	<25mA	≥5mA	≤1.5VDC	10-40A	12-250V DC		VAC Diode_			
3Pha	ase SSR	3-32 V DC	<30mA	≥9ma	≤25VDC	10-120A	380V AC		RC MOV	Fast Fuse		
Re	tateVoltage gulator :调压器	Commence of the Commence of th	ometer 4	<b>70K</b> Ω/2	W电位器	10-40A	10-250V AC		RC MOV	Fast Fuse		



RC: Built-in resistance capacity absorption circuit. 内置阻容吸收保护回路

MOV: External shunt metal oxide varistor.外部并联压敏电阻

Z拿L°III ZENLI RECTIFIER CO.,LTD 浙江正力整流器

### Notes 使用注意事项

- 1.Strictly prohibit for load short circuit.Can use fast fuse.严禁短路负载,可以使用快速熔断器。
- 2.Ling time working current can't over 70% of the nominal value.长期工作不能超过额定值的70%。
- 3.Heatsink temperature can't over 75℃. 散热器温度不能超过与75℃
- 4.Use at inductive load area, add varistor for protect is better. 用于感性负载,加压敏电阻保护更好。

### Recommended value of load type (Room temperature) 各种负载推荐值(常温)

负载类型	纯电阻	电热丝	白炽灯泡	变压器/电磁铁	单相交流电机	三相交流电机
Load type	Pure Resistance	Electric hot wire	Incandescent lamp	Transformer/Electromagnet	1 phase AC motor	3 phase AC motor
value of load	100%	50-70%	35-50%	25-40%	12-24%	18-33%

# GENERAL SOLID STATE RELAY | 通用固态继电器

## DC control AC



SSR-D4810 SSR-D4825, SSR-D4840

Operation Current 负载电流	10A, 25A, 40A		
Operation Voltage 负载电压	24-480V AC		
Control Voltage 控制电压	3-32V DC		
Control Current 控制电流	DC 3-25mA		
V <sub>TM</sub> 通态压降	≤1.5V		
I <sub>RRM</sub> 漏电流	≤10mA		
T。关断时间	≤10mS		
V iso 绝缘电压	2500V AC		
R iso 绝缘电阻	1000mΩ 500V DC		
Tj 工作温度	-30~+80℃		
Weight 重量	90g		

### DC control AC



SSR-D48100, SSR-D48120

Operation Current 负载电流	100A, 120A
Operation Voltage 负载电压	24-480V AC
Control Voltage 控制电压	3-32V DC
Control Current 控制电流	DC 3-25mA
V <sub>™</sub> 通态压降	≤1.5V
I <sub>RRM</sub> 漏电流	≤20mA
Ta关断时间	≤10mS
V iso 绝缘电压	2500V AC
R iso 绝缘电阻	1000mΩ 500V DC
Tj 工作温度	-30~+80℃
Weight 重量	145a

## DC control AC



SSR-D4860, SSR-D4880

#### **AC control AC**



SSR-A2410 SSR-A2425, SSR-A2440

Operation Current 负载电流	60A, 80A
Operation Voltage 负载电压	24-480V AC
Control Voltage 控制电压	3-32V DC
Control Current 控制电流	DC 3-25mA
V <sub>TM</sub> 通态压降	≤1.45V
I <sub>RRM</sub> 漏电流	≤15mA
Ta关断时间	≤10mS
V iso 绝缘电压	2500V AC
R iso 绝缘电阻	1000mΩ 500V DC
Tj 工作温度	-30~+80℃
Weight 重量	125g

Operation Current 负载电流	10A, 25A, 40A
Operation Voltage 负载电压	24-240V AC
Control Voltage 控制电压	90-280V AC
Control Current 控制电流	AC ≤12mA
V ™ 通态压降	≤1.5V
I <sub>RRM</sub> 漏电流	≤110mA
Ta关断时间	≤10mS
V iso 绝缘电压	2500V AC
R iso 绝缘电阻	1000mΩ 500V DC
Tj 工作温度	-30~+80℃
Weight 重量	90g

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### **AC control AC**



SSR-A2460, SSR-A2480

Operation Current 负载电流	60A, 80A
Operation Voltage 负载电压	24-240V AC
Control Voltage 控制电压	90-280V AC
Control Current 控制电流	AC ≤12mA
V <sub>TM</sub> 通态压降	≤1.45V
I <sub>RRM</sub> 漏电流	≤15mA
Ta关断时间	≤10mS
V iso 绝缘电压	2500V AC
R iso 绝缘电阻	1000mΩ 500V DC
Tj 工作温度	-30~+80℃
Weight 重量	125g

# DC control DC



SSR-DD2410

Operation Current 负载电流	10A, 25A, 40A		
Operation Voltage 负载电压	12-240V AC		
Control Voltage 控制电压	3-32V DC		
Control Current 控制电流	DC 3-25mA		
V <sub>TM</sub> 通态压降	≤2.3V		
I <sub>RRM</sub> 漏电流	≤5mA		
Ta关断时间	≤10mS		
V iso 绝缘电压	2500V AC		
R iso 绝缘电阻	1000mΩ 500V DC		
Tj 工作温度	-30~+80℃		
Weight 重量	90g		

SSR-DD2425, SSR-DD2440

**Industry class SSR** 



SSR-HD 80A, 100A, 150A

Operation Current 负载电流	80A, 100A, 150A		
Operation Voltage 负载电压	24-480V AC		
Control Voltage 控制电压	3-32V DC		
Control Current 控制电流	DC 3-25mA		
V <sub>TM</sub> 通态压降	≤1.5V		
I <sub>RRM</sub> 漏电流	≤20mA		
Ta关断时间	≤10mS		
V iso 绝缘电压	2500V AC		
R iso 绝缘电阻	1000mΩ 500V DC		
Tj 工作温度	-30~+80℃		
Weight 重量	160g		

# **Industry class SSR**



SSR-HD 400A, 500A, 600A

Operation Current 负载电流	400A, 500A, 600A
Operation Voltage 负载电压	24-480V AC
Control Voltage 控制电压	3-32V DC
Control Current 控制电流	DC 3-25mA
V <sub>TM</sub> 通态压降	≤1.6V
I <sub>RRM</sub> 漏电流	≤20mA
Tq关断时间	≤10mS
V iso 绝缘电压	2500V AC
R iso 绝缘电阻	1000mΩ 500V DC
Tj 工作温度	-30~+80℃
Weight 重量	900g

# **AC control AC**



SSR-A24100, SSR-A24120

100A, 120A		
24-240V AC		
90-280V AC		
AC ≤12mA		
≤1.5V		
≤20mA		
≤10mS		
2500V AC		
1000mΩ 500V DC		
-30~+80℃		
145g		

# Voltage Regulator



SSR-V3810 SSR-V3825, SSR-V3840

10A, 25A, 40A
24-380V AC
470KΩ/2W
/
≤1.5V
≤5mA
1
2500V AC
1000mΩ 500V DC
-30~+80℃
90g

# **Industry class SSR**



SSR-HD 200A, 250A, 300A

Operation Current 负载电流	200A, 250A, 300A
Operation Voltage 负载电压	24-480V AC
Control Voltage 控制电压	3-32V DC
Control Current 控制电流	DC 3-25mA
V <sub>TM</sub> 通态压降	≤1.5V
I <sub>RRM</sub> 漏电流	≤20mA
Ta关断时间	≤10mS
V iso 绝缘电压	2500V AC
R iso 绝缘电阻	1000mΩ 500V DC
Tj 工作温度	-30~+80℃
Weight 重量	250g

### 3 Phase SSR



SSR-3P 10A, 25A, 40A

10A, 25A, 40A
24-480V AC
3-32V DC
DC 3-25mA
≤1.5V
≤15mA
≤10mS
2500V AC
1000mΩ 500V DC
-30~+80℃
350g

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# STS - TONet -

#### 3 Phase SSR



SSR-3P 60A, 80A, 100A, 120A

60A, 80A 100A, 120A
24-480V AC
3-32V DC
DC 3-25mA
≤1.5V
≤15mA
≤10mS
2500V AC
1000m $\Omega$ 500V DC
-30~+80℃
450g

### 3 Phase SSR



SSR-3P 200A, 250A, 300A, 400A

Operation Current 负载电流	200A, 250A 300A, 400A
Operation Voltage 负载电压	24-480V AC
Control Voltage 控制电压	3-32V DC
Control Current 控制电流	DC 3-25mA
V <sub>™</sub> 通态压降	≤1.6V
I <sub>RRM</sub> 漏电流	≤15mA
TQ关断时间	≤10mS
V iso 绝缘电压	2500V AC
R iso 绝缘电阻	1000mΩ 500V DC
Tj 工作温度	-30~+80℃
Weight 重量	4500g

# IMPROVED DESIGN SOLID STATE RELAY

# **Ordering Information Table**



- 1 -ZENLI Improved design Solid State Relay
- 2 -Operational current
- 3 -Control Voltage
- 4 -Operation Voltage



专利设计,采用一体式翻盖保护造型,操作方 便,防护罩不易丢失。

Patent design, using the coverprotection model, easy to operate

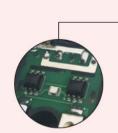


底板采用特殊电镀, 光泽细腻匀称。抗 氧化, 耐腐蚀, 散热性能好。 Special electroplating for plate, antioxidation, well heat dissipation.



高品质螺丝,六角套筒或螺丝刀均可进行操作。一体式 固定垫片,无接线端子的铜线也可直接使用。

High quality screw, can operate by hexagonal sleeve or screwdriver. Integral fixed gasket, wire without terminal can also be used directly.



SMT双面板全贴片工艺,视觉检查杜绝虚焊,双光耦控制+ 下限保护设计,精选进口电子元器件,优选美国Crydom和 法国Celduc的驱动优势, 抗干扰能力强,控制精准。

SMT double panel full patch process, optimize the driving advantages of Crydom and Celcu, strong anti-interference ability, accurate control.



内部结构设计功率器件直接导通安装紫铜电极,过电流能 力强。辅助铜卡件,螺纹精准并能辅助增强导电能力。 Power device directly conducts with copper electrode, which has strong overcurrent ability. Brass fasteners with precise threads help to enhance conductivity.



真空灌封进口透明硅凝胶,导热性能优越,绝缘特性强。 多层密封设计,防水 防尘 抗盐雾,可在多种严苛环境下 稳定使用。

Transparent silicone gel has excellent thermal conductivity and strong insulation characteristics. Multi-layer sealing design, waterproof, dustproof and salt fog resistance, can be used stably in harsh environments.





### DC control AC



SSR10DA SSR25DA, SSR40DA

#### Operation Current 负载电流 10A, 25A, 40A Operation Voltage 负载电压 24-380V AC Control Voltage 控制电压 4-32V DC Control Current 控制电流 DC 3-25mA V<sub>TM</sub> 通态压降 ≤1.4V I<sub>RRM</sub> 漏电流 ≤10mA TQ关断时间 ≤10mS V iso 绝缘电压 3000V AC R iso 绝缘电阻 1000mΩ 500V DC Tj 工作温度 -35~+85℃ Weight 重量 95g

# DC control AC



SSR60DA SSR80DA,SSR100DA

60A, 80A, 100A
24-380V AC
4-32V DC
DC 3-25mA
≤1.40V
≤10mA
≤10mS
3000V AC
1000mΩ 500V DC
-35~+85℃
135g

### **AC** control **AC**



SSR10AA SSR25AA, SSR40AA

Operation Current 负载电流	10A, 25A, 40A
Operation Voltage 负载电压	24-380V AC
Control Voltage 控制电压	80-250V AC
Control Current 控制电流	AC ≤12mA
V <sub>TM</sub> 通态压降	≤1.4V
I <sub>RRM</sub> 漏电流	≤10mA
TQ关断时间	≤10mS
V iso 绝缘电压	3000V AC
R iso 绝缘电阻	1000mΩ 500V DC
Tj 工作温度	-35~+85℃
Weight 重量	95g

**AC control AC** 



SSR60AA SSR80AA,SSR100AA

Operation Current 负载电流	60A, 80A, 100A
Operation Voltage 负载电压	24-380V AC
Control Voltage 控制电压	80-250V AC
Control Current 控制电流	AC ≤12mA
V <sub>TM</sub> 通态压降	≤1.40V
I <sub>RRM</sub> 漏电流	≤10mA
TQ关断时间	≤10mS
V iso 绝缘电压	3000V AC
R iso 绝缘电阻	1000mΩ 500V DC
Tj 工作温度	-35~+85℃
Weight 重量	135g

### DC control DC



SSR10DD SSR25DD, SSR40DD

Operation Current 负载电流	10A, 25A, 40A
Operation Voltage 负载电压	12-240V AC
Control Voltage 控制电压	4-32V DC
Control Current 控制电流	DC 3-25mA
V <sub>TM</sub> 通态压降	≤2.2V
I <sub>RRM</sub> 漏电流	≤2mA
Ta关断时间	≤10mS
V iso 绝缘电压	3000V AC
R iso 绝缘电阻	1000mΩ 500V DC
Tj 工作温度	-35~+85℃
Weight 重量	95g

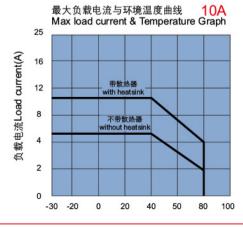
Voltage Regulator

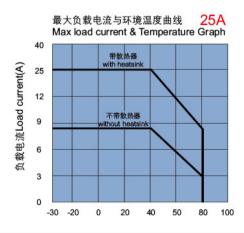


SSR10VA SSR25VA, SSR40VA

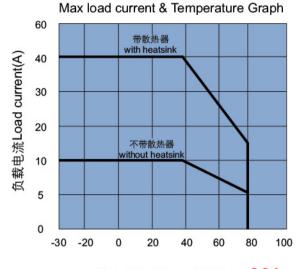
Operation Current 负载电流	10A, 25A, 40A
Operation Voltage 负载电压	24-380V AC
Control Voltage 控制电压	500KΩ/ <sub>1/4</sub> W
Control Current 控制电流	1
V <sub>TM</sub> 通态压降	≤1.4V
I <sub>RRM</sub> 漏电流	≤2mA
Ta关断时间	1
V iso 绝缘电压	3000V AC
R iso 绝缘电阻	1000mΩ 500V DC
Tj 工作温度	-35~+85℃
Weight 重量	95g

# Dissipative Power Curve of SSR固态继电器耗散功率曲线图





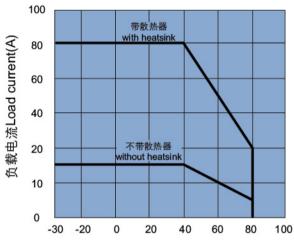




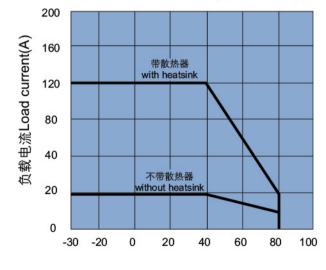
最大负载电流与环境温度曲线

40A

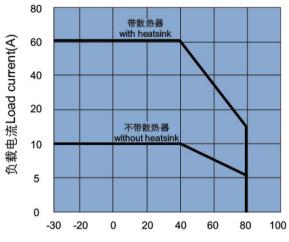
最大负载电流与环境温度曲线 80A Max load current & Temperature Graph



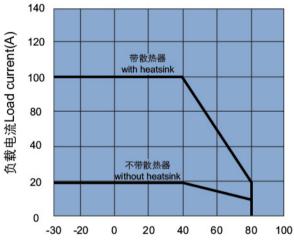
最大负载电流与环境温度曲线 120A Max load current & Temperature Graph



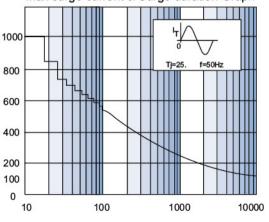
最大负载电流与环境温度曲线 60A Max load current & Temperature Graph



最大负载电流与环境温度曲线 100A Max load current & Temperature Graph



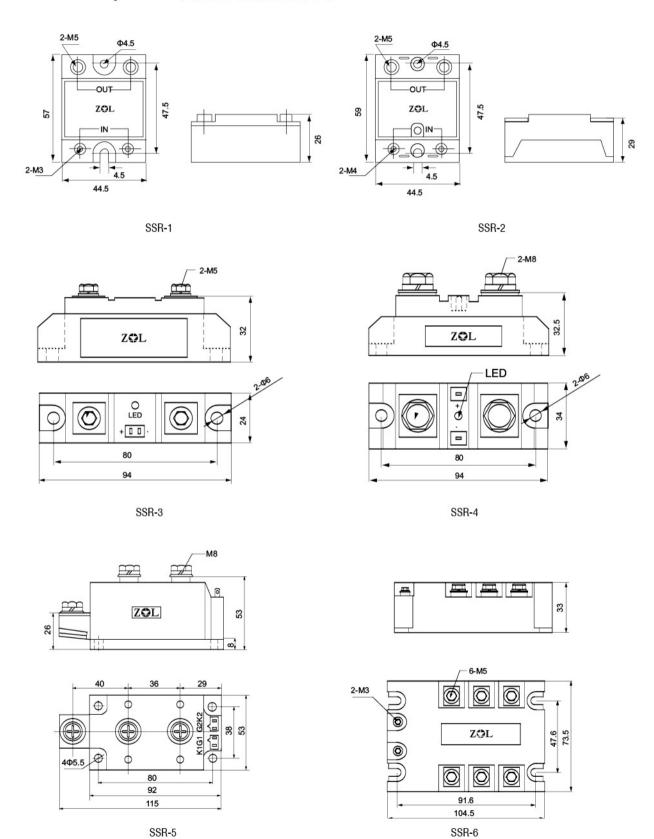
最大浪涌电流与浪涌持续时间曲线 Max surge current & Surge duration Graph







# Solid State Relay Outline 固态继电器外形尺寸

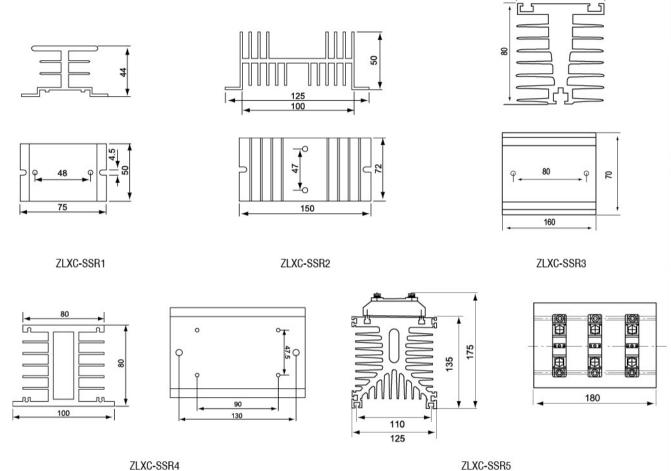


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# State Relay Heatsink 固态继电器用散热器



# SSR Auxiliary Parts 固态继电器辅件

