



NJG2 Solid-state Relays

1 Scope of Application

- NJG2 solid-state relays (SSRs) are switching devices that use semiconductor components to replace contact contacts. Photoelectric isolation is provided between the input and output ends. When a control signal is applied to the input end, the output end can change from the off state to the on state.
- NJG2 SSRs are suitable for resistive, inductive and capacitive loads, and can be widely used in various automation control fields such as electric furnace heating/thermostatic systems, CNC machinery, plastic machinery, food machinery, packaging machinery, textile machinery, petrochemical equipment, entertainment facilities. NJG2 SSRs are available with an input control voltage of DC3~32V/AC90~250V, an output current of 10A/15A/20A/25A/30A/40A/60A/80A/100A/120A, and an output voltage range of AC24~240V/AC40~480V/DC12~250V.

2 Normal Operating and Installation Conditions

Temperature range: $-5^{\circ}\text{C}\sim 40^{\circ}\text{C}$

Humidity range: up to 85% @ $+25^{\circ}\text{C}$

Installation: panel-mounted

Motor Control and Protection

3 Model Description

NJG2 SSRs

NJG2	-	S	D	A	032	□	□	□
Model		Input Type	Input Voltage Type	Output Voltage Type	Input Voltage	Maximum Load Current	Load Voltage	Conduction Mode
		S: Single-phase T: Three-phase	D: DC A: AC	D: DC A: AC	DD 032 : DC 5~32V DA 032: DC 3~32V AA 250: AC 90~250V	10A、15A、 20A、25A、 30A、40A、 60A、80A、 100A、120A	220 : AC24~240V, 380: AC40~480V, 024: DC12~250V	F: Closed type, omitted by default.

Model example: NJG2-SDA032-10A220 stands for a single-phase SSR,DC input voltage: DC3~32V, AC output load voltage: AC24~240V, load current Ith: 10A.

4 Main Parameters and Technical Performance

Main Parameters and Technical Performance

Table 1

Model		Input Parameters						Output Parameters							Operating Current Safety Factor	
		Control Voltage (V)	Control Current (mA)	On Voltage (VDC)	On Current (mA)	Off Voltage (VDC)	Operation Indicator	Output Voltage (V)	Output Current (A)	Medium Withstand Voltage (VAC)	On-state Voltage Drop (VAC)	Frequency Range (Hz)	Voltage Rise Rate (V/μs)	Cooling	Resistive Load	Inductive Load
Single-phase	NJG2-SD	5-32 VDC		5	≤7	3.0	LED	12-250 VDC	10-20	≥1500	< 1.5 VDC	/	1000	10-100A models: heatsink + additional fan-forced cooling (to be activated when the temperature exceeds 60°C) Thermal silicone grease must be applied between the product and the heatsink	60%	40%
	NJG2-SA	3-32 VDC	< 25	3	≤7	≤1.5	LED	24-240 40-480 VAC	10-120	≥2500	< 1.5	47-63	500			
		90-250 VAC	< 16	90VAC	≤7	10VAC	LED			≥2500	< 1.5	47-63	500			
Three-phase	NJG2-TA	3-32 VDC	< 25	3	≤15	≤1.5	LED		10-120	≥2500	< 1.5	47-63	500			
		90-250 VAC	< 30	90VAC	≤15	10VAC	LED			≥2500	< 1.5	47-63	500			

For selection of heatsinks, please refer to Table 2.

Table 2

SSR Type & Current	Single-phase, ≤20A	Single-phase, ≤40A	Single-phase, ≤60A	Single-phase, ≤80A	Single-phase, ≤120A	Three-phase, ≤20A	Three-phase, ≤30A	Three-phase, ≤40A	Three-phase, ≤60A	Three-phase, ≤120A
Heatsink Model	RAD-NJG2-060	RAD-NJG2-061	RAD-NJG2-062	RAD-NJG2-063	RAD-NJG2-036	RAD-NJG2-035	RAD-NJG2-034	RAD-NJG2-036	RAD-NJG2-037	RAD-NJG2-038

For load derating, please refer to Table 3.

Table 3

Load Type	Pure Resistance	Heating Wire	Incandescent Lamp	Transformer	Electromagnet	Single-phase Motor	Three-phase Motor	Capacitor Switching
Power Factor	1.0	0.7	0.5	0.4	0.5	0.2	0.3	Surge
Amplification Factor	1.5 times	2 times	2.5 times	4 times	4 times	7 times	6 times	10 times

Table 4

Model	Input Parameters					Output Parameters																													
	Input Control Voltage	On Voltage	Off Voltage	Input Control Voltage	Reverse Polarity Voltage	Output Voltage Range	Output Voltage Frequency	Blocking Voltage	On-state Current	Overload Current	Maximum R	Maximum Surge Current	Off-state Current	On-state Voltage	Turn-on Time	Turn-off Time	Off-state Voltage Critical Rise Rate	Minimum Load Power Factor	Medium Withstand Voltage	Insulation Resistance	Operation Indicator	Protection Type													
NJG2-SDA032-10A220	3-32 VDC	3 VDC	≤1.5 VDC	< 25 mA	-32 VDC	24-240 VAC	47-63Hz	550 VAC	10A	< 150%	85	120	≤ 10mA	< 1.5 VAC	≤1/2 cycle +1ms	≤1/2 cycle +1ms	500V/μs	0.5	≥ 2500 VAC	500 MΩ (DC 500V)	LED	RC protection													
NJG2-SDA032-15A220									15A		128	160																							
NJG2-SDA032-20A220									20A		288	240																							
NJG2-SDA032-25A220									25A		450	300																							
NJG2-SDA032-30A220									30A		660	380																							
NJG2-SDA032-40A220									40A		840	410																							
NJG2-SDA032-60A220									60A		1800	780																							
NJG2-SDA032-80A220									80A		3200	1000																							
NJG2-SDA032-100A220									100A		6000	1600																							
NJG2-SDA032-120A220									120A		8500	1800																							
NJG2-SDA032-10A380									40-480 VAC		47-63Hz	550 VAC											10A	< 150%	85	120	≤ 10mA	< 1.5 VAC	≤1/2 cycle +1ms	≤ 40ms	500V/μs	0.5	≥ 2500 VAC	500 MΩ (DC 500V)	RC protection
NJG2-SDA032-15A380																							15A		128	160									
NJG2-SDA032-20A380	20A	288	240																																
NJG2-SDA032-25A380	25A	450	300																																
NJG2-SDA032-30A380	30A	660	380																																
NJG2-SDA032-40A380	40A	840	410																																
NJG2-SDA032-60A380	60A	1800	780																																
NJG2-SDA032-80A380	80A	3200	1000																																
NJG2-SDA032-100A380	100A	6000	1600																																
NJG2-SDA032-120A380	120A	8500	1800																																
NJG2-SAA250-10A220	90-250 VAC	90 VAC	10 VAC	< 30 mA	24-240 VAC	47-63Hz	550 VAC	10A		150%			85	120	≤ 10mA	< 1.5 VAC	≤1/2 cycle +1ms	≤ 40ms	500V/μs	0.5	≥ 2500 VAC	500 MΩ (DC 500V)	LED		RC protection										
NJG2-SAA250-15A220								15A					128	160																					
NJG2-SAA250-20A220								20A	288		240																								
NJG2-SAA250-25A220								25A	450		300																								
NJG2-SAA250-30A220								30A	660		380																								
NJG2-SAA250-40A220								40A	840		410																								
NJG2-SAA250-60A220								60A	1800		780																								
NJG2-SAA250-80A220								80A	3200		1000																								
NJG2-SAA250-100A220								100A	6000		1600																								
NJG2-SAA250-120A220								120A	8500		1800																								
NJG2-SAA250-10A380								40-480 VAC	47-63Hz		550 VAC	10A	150%	85										120		≤ 10mA	< 1.5 VAC	≤1/2 cycle +1ms	≤ 40ms	500V/μs	0.5	≥ 2500 VAC	500 MΩ (DC 500V)	RC protection	
NJG2-SAA250-15A380												15A		128										160											
NJG2-SAA250-20A380	20A	288	240																																
NJG2-SAA250-25A380	25A	450	300																																
NJG2-SAA250-30A380	30A	660	380																																
NJG2-SAA250-40A380	40A	840	410																																
NJG2-SAA250-60A380	60A	1800	780																																
NJG2-SAA250-80A380	80A	3200	1000																																
NJG2-SAA250-100A380	100A	6000	1600																																
NJG2-SAA250-120A380	120A	8500	1800																																
NJG2-SDD032-10A024	5-32 VDC	5 VDC	3.0 VDC	<45 mA	-32 VDC	12-250 VDC				250 VDC		10A		110%		90	≤ 5mA	< 1.5 VDC	≤ 5ms	≤ 5ms	1000V/μs		≥ 1500 VAC	500 MΩ (DC 500V)	LED										
NJG2-SDD032-15A024												15A				120																			
NJG2-SDD032-20A024								20A	150																										
NJG2-TDA032-10A380	3-32 VDC	3 VDC	≤ 1.5 VDC	< 25 mA	-32 VDC	40-480 VAC	47-63Hz	550 VAC	10A	150%	85	120	≤ 10mA	< 1.5 VAC	≤1/2 cycle +1ms	≤1/2 cycle +1ms	500V/μs	0.5	≥ 2500 VAC	500 MΩ (DC 500V)	RC protection														
NJG2-TDA032-15A380									15A		128	160																							
NJG2-TDA032-20A380									20A		288	240																							
NJG2-TDA032-25A380									25A		450	300																							
NJG2-TDA032-30A380									30A		660	380																							
NJG2-TDA032-40A380									40A		840	410																							
NJG2-TDA032-60A380									60A		1800	780																							
NJG2-TDA032-80A380									80A		3200	1000																							
NJG2-TDA032-100A380								800 VAC	100A		6000	1600																							
NJG2-TDA032-120A380									120A		8500	1800																							

Table 4

Model	Input Parameters					Output Parameters																
	Input Control Voltage	On Voltage	Off Voltage	Input Control Voltage	Reverse Polarity Voltage	Output Voltage Range	Output Voltage Frequency	Blocking Voltage	On-state Current	Overload Current	Maximum P _T	Maximum Surge Current	Off-state Current	On-state Voltage	Turn-on Time	Turn-off Time	Off-state Voltage Critical Rise Rate	Minimum Load Power Factor	Medium Withstand Voltage	Insulation Resistance	Operation Indicator	Protection Type
NJG2-TAA250-10A380	90-250 VAC	90 VAC	10 VAC	< 30 mA		40-480 VAC	47-63Hz	550 VAC	10A	150%	85	120	≤ 10mA	< 1.5 VAC	≤ 1/2 cycle +1ms	≤ 40ms	500V/μs	0.5	≥ 2500 VAC	500 MΩ (DC 500V)		RC protection
NJG2-TAA250-15A380									15A		128	160										
NJG2-TAA250-20A380									20A		288	240										
NJG2-TAA250-25A380									25A		450	300										
NJG2-TAA250-30A380									30A		660	380										
NJG2-TAA250-40A380									40A		840	410										
NJG2-TAA250-60A380									60A		1800	780										
NJG2-TAA250-80A380									80A		3200	1000										
NJG2-TAA250-100A380									100A		6000	1600										
NJG2-TAA250-120A380									120A		8500	1800										

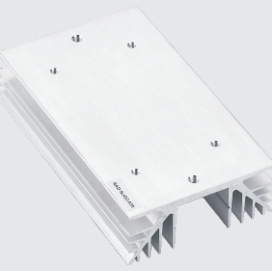
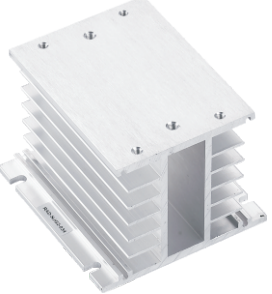
5 Accessories

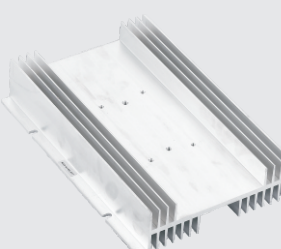
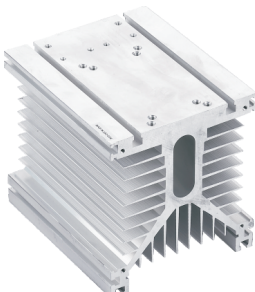
Purpose

Heatsinks are accessories of SSRs, and mainly used to conduct, absorb and radiate the heat generated by the SSRs.

The user should select a heatsink to be used with the SSR according to the output current of the selected SSR and ambient conditions.

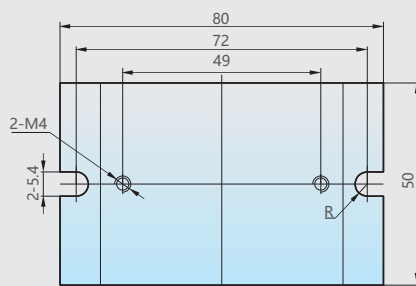
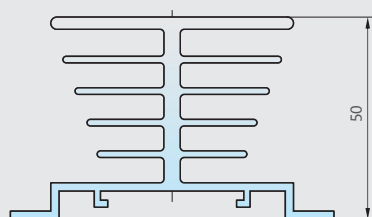
Product Model	Rated On-state (Load) Current	Heatsink	Heatsink Thermal Resistance (°C/W)	Weight (≈g)	Cooling	Overall Dimensions (mm)	Installation Dimensions (mm)	
NJG2-SDA032-10A220	10A	RAD-NJG2-060	2.19	100	Natural cooling	50*80*50	72	
NJG2-SDA032-10A380								
NJG2-SAA250-10A220								
NJG2-SAA250-10A380								
NJG2-SDD032-10A024								
NJG2-SDA032-15A220	15A							
NJG2-SDA032-15A380								
NJG2-SAA250-15A220								
NJG2-SAA250-15A380								
NJG2-SDD032-15A024								
NJG2-SDA032-20A220	20A							
NJG2-SDA032-20A380								
NJG2-SAA250-20A220								
NJG2-SAA250-20A380								
NJG2-SDD032-20A024								
NJG2-SDA032-25A220	25A	RAD-NJG2-061	1.49	200	Natural cooling	70*125*50	115	
NJG2-SDA032-25A380								
NJG2-SAA250-25A220								
NJG2-SAA250-25A380								
NJG2-SDA032-30A220	30A							
NJG2-SDA032-30A380								
NJG2-SAA250-30A220								
NJG2-SAA250-30A380								
NJG2-SDA032-40A220	40A							
NJG2-SDA032-40A380								
NJG2-SAA250-40A220								
NJG2-SAA250-40A380								

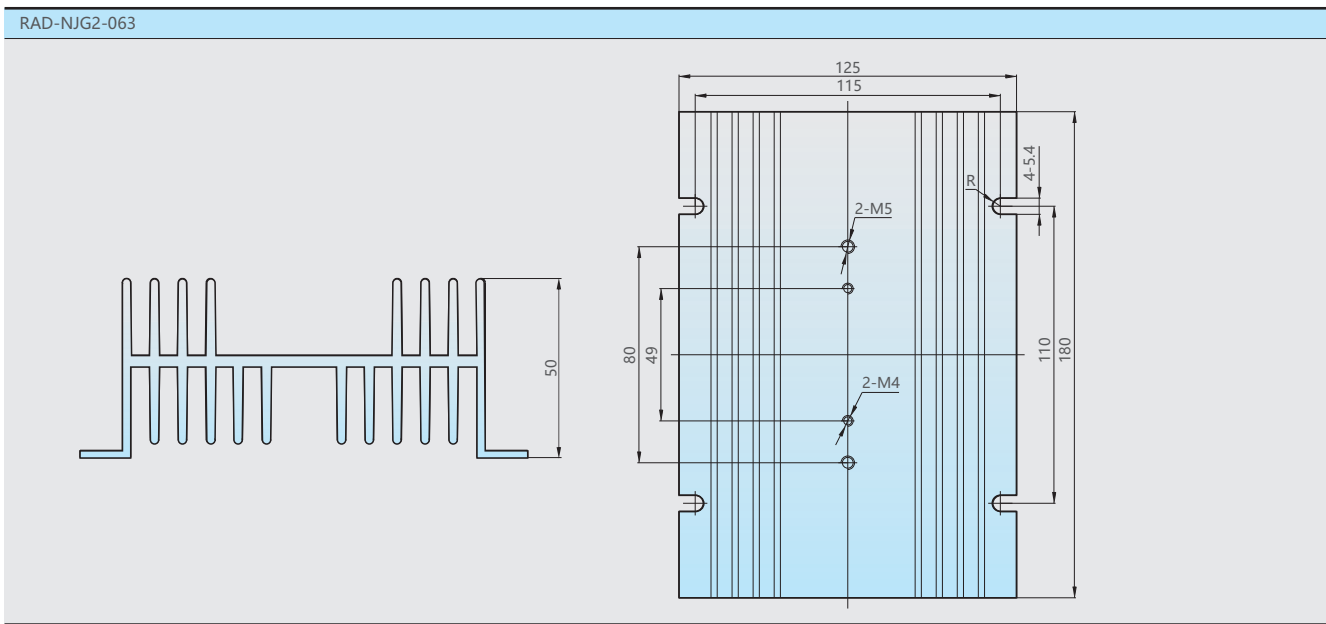
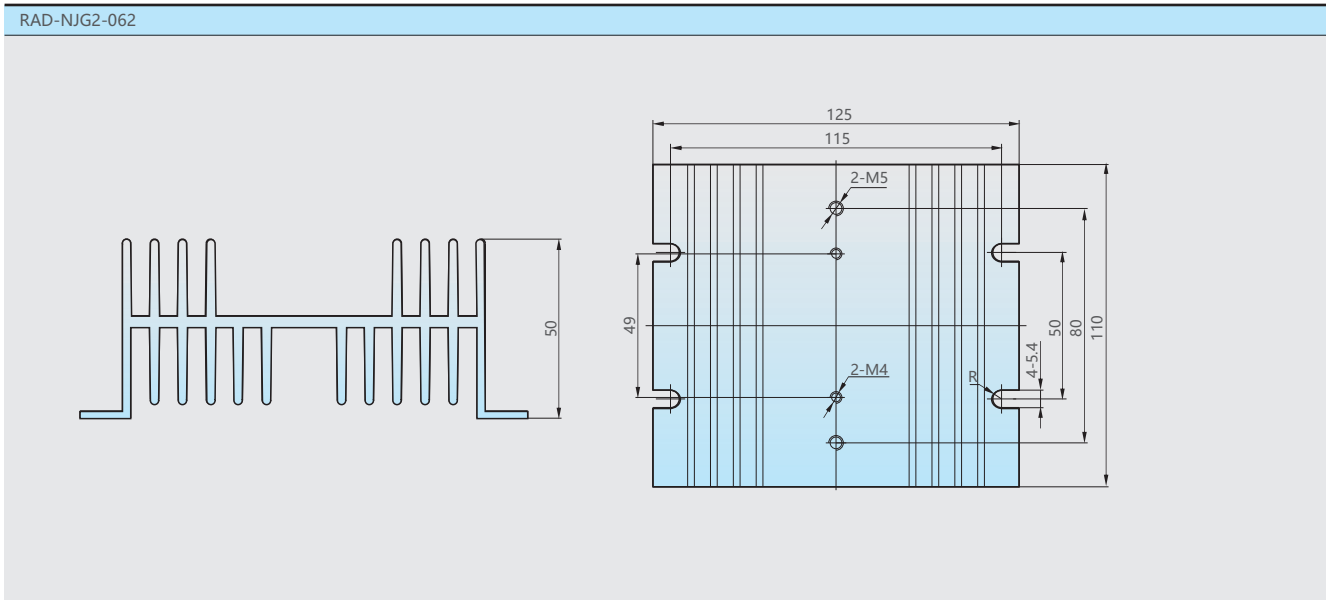
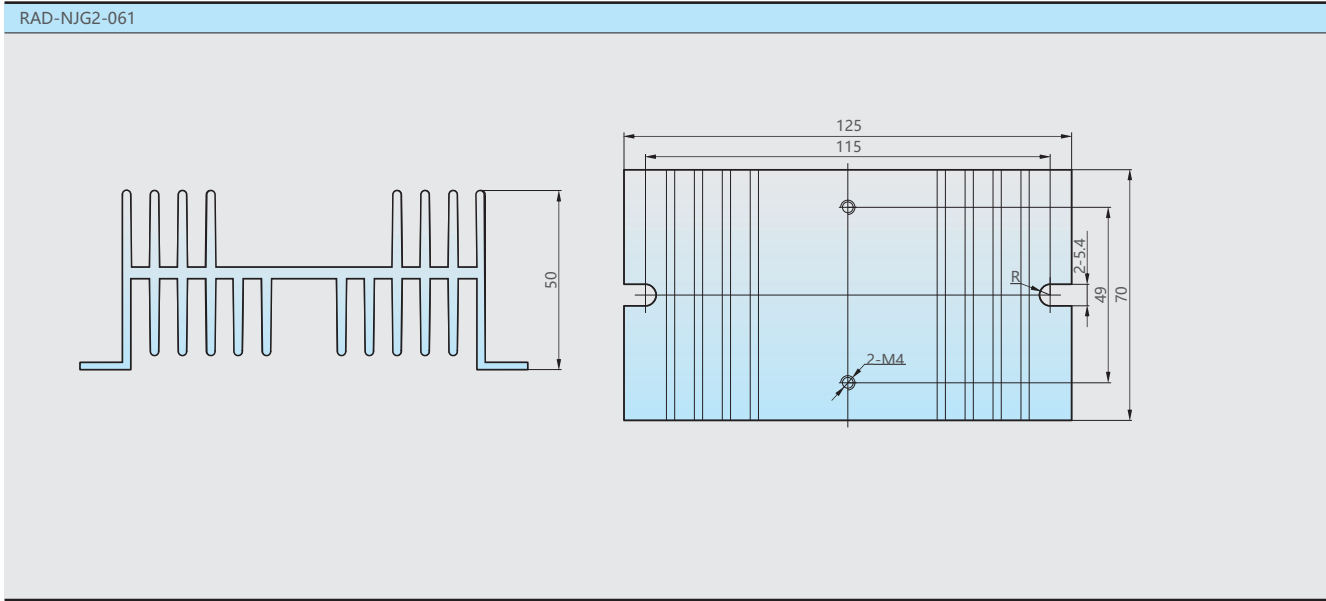
Product Model	Rated On-state (Load) Current	Heatsink	Heatsink Thermal Resistance (°C/W)	Weight (≈g)	Cooling	Overall Dimensions (mm)	Installation Dimensions (mm)	
NJG2-SDA032-60A220	60A	RAD-NJG2-062	1.35	300	Natural cooling	110*125*50	115*50	
NJG2-SDA032-60A380								
NJG2-SAA250-60A220								
NJG2-SAA250-60A380								
NJG2-SDA032-80A220	80A	RAD-NJG2-063	1.07	530	Natural cooling	180*125*50	115*110	
NJG2-SDA032-80A380								
NJG2-SAA250-80A220								
NJG2-SAA250-80A380								
NJG2-SDA032-100A220	100A	RAD-NJG2-036	0.48	680	Natural cooling	150*100*80	91*92	
NJG2-SDA032-100A380								
NJG2-SAA250-100A220								
NJG2-SAA250-100A380								
NJG2-SDA032-120A220	120A							
NJG2-SDA032-120A380								
NJG2-SAA250-120A220								
NJG2-SAA250-120A380								
NJG2-TDA032-10A380	10A	RAD-NJG2-035	0.93	370	Natural cooling	150*88*35	130	
NJG2-TAA250-10A380								
NJG2-TDA032-15A380	15A							
NJG2-TAA250-15A380								
NJG2-TDA032-20A380	20A							
NJG2-TAA250-20A380								
NJG2-TDA032-25A380	25A	RAD-NJG2-034	0.65	475	Natural cooling	105*100*80	91*75	
NJG2-TAA250-25A380								
NJG2-TDA032-30A380	30A							
NJG2-TAA250-30A380								

Product Model	Rated On-state (Load) Current	Heatsink	Heatsink Thermal Resistance (°C/W)	Weight (≈g)	Cooling	Overall Dimensions (mm)	Installation Dimensions (mm)	
NJG2-TDA032-40A380	40A	RAD-NJG2-036	0.48	680	Natural cooling	150*100*80	91*92	
NJG2-TAA250-40A380								
NJG2-TDA032-60A380	60A	RAD-NJG2-037	0.44	1400	Natural cooling	260*180*50	168*140	
NJG2-TAA250-60A380								
NJG2-TDA032-80A380	80A	RAD-NJG2-038	0.39	2000	Natural cooling	150*125*135	91*92	
NJG2-TAA250-80A380								
NJG2-TDA032-100A380	100A							
NJG2-TAA250-100A380								
NJG2-TDA032-120A380	120A							
NJG2-TAA250-120A380								

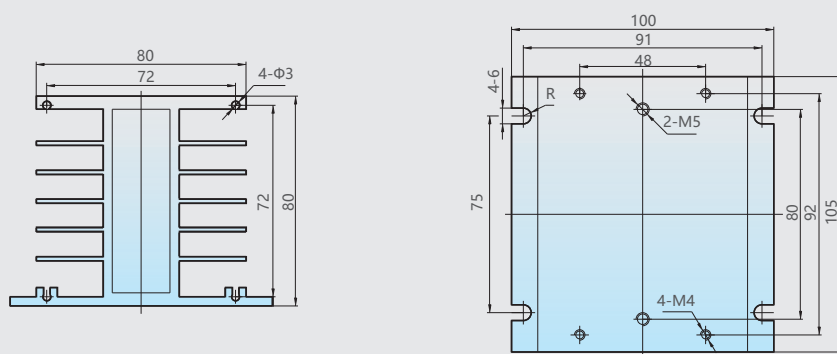
6 Overall & Installation Dimensions of Heatsink

RAD-NJG2-060

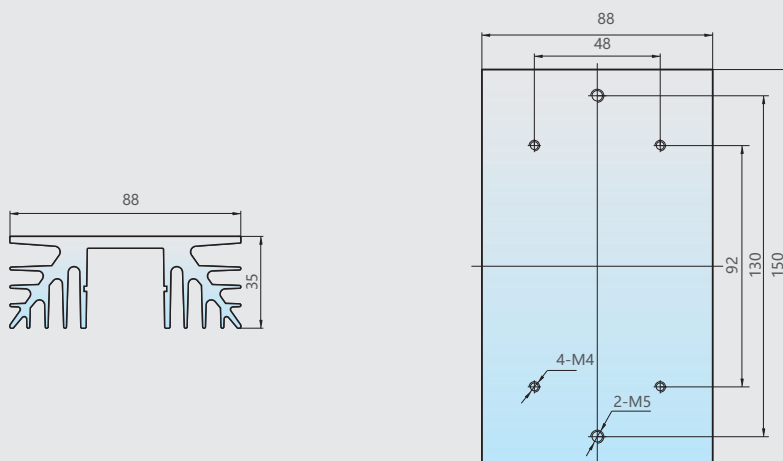




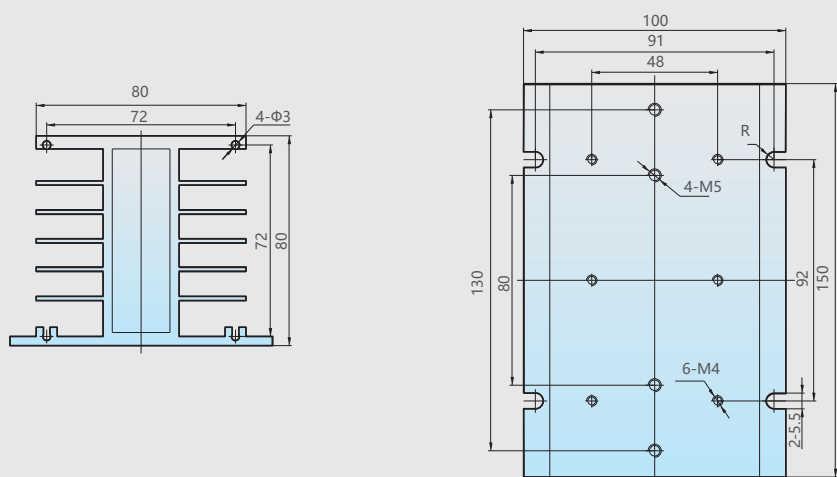
RAD-NJG2-034



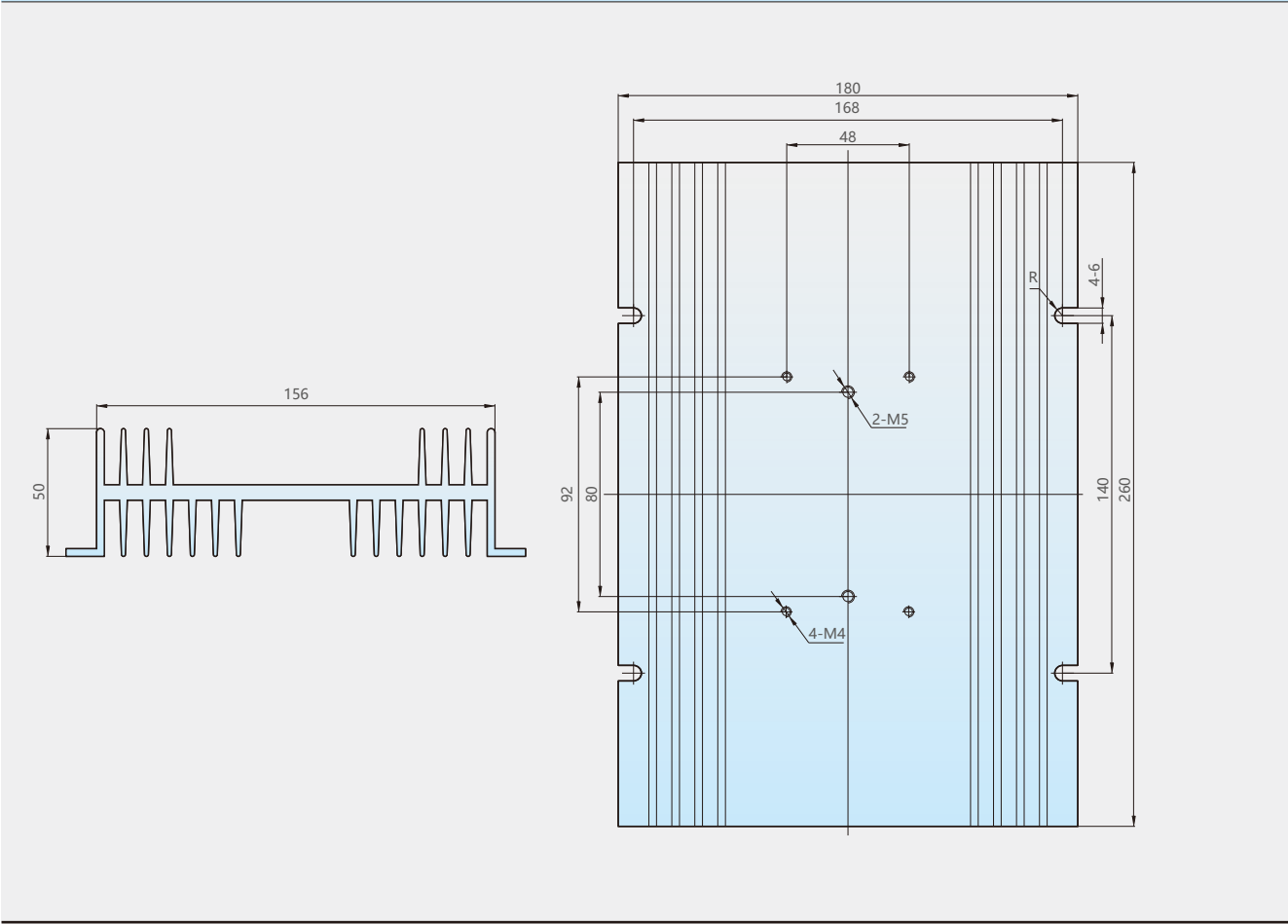
RAD-NJG2-035



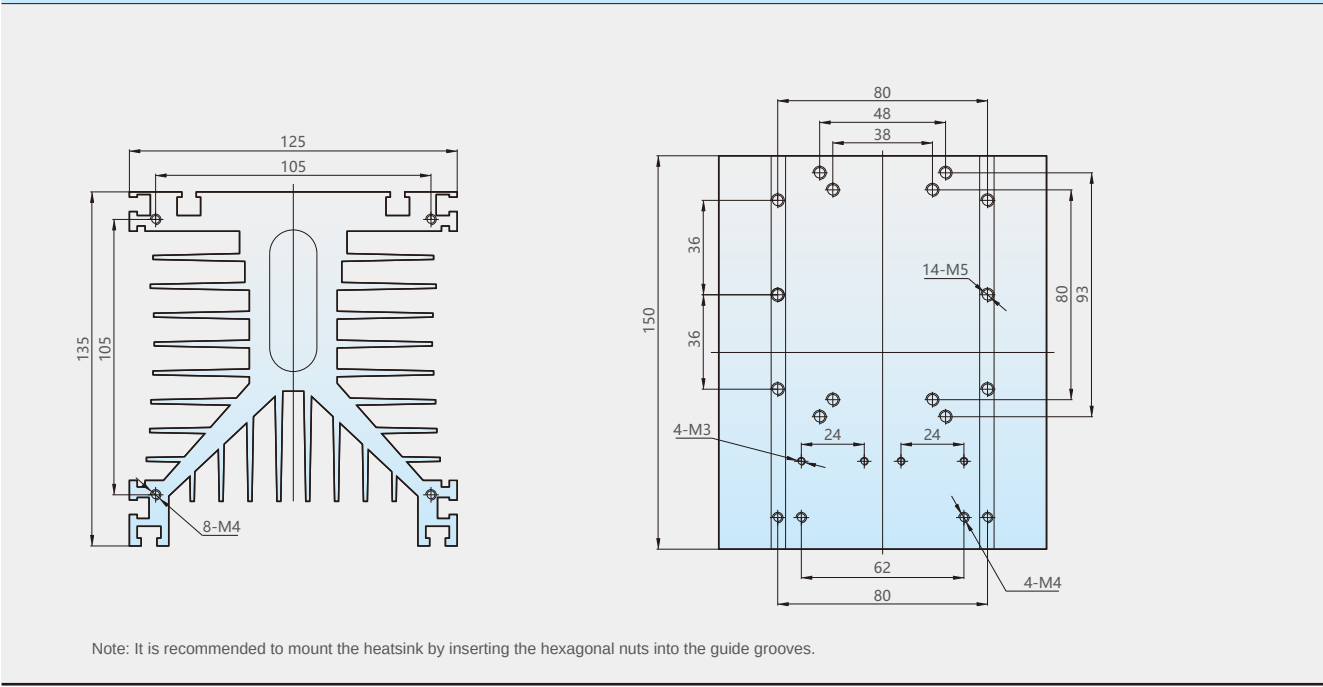
RAD-NJG2-036



RAD-NJG2-037



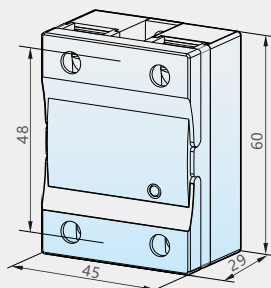
RAD-NJG2-038



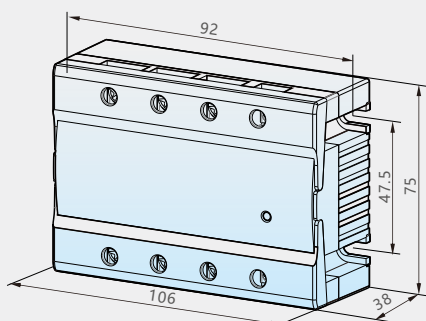
7 Overall & Installation Dimensions Diagram

Overall & Installation Dimensions

Single-phase SSR



Three-phase SSR



8 Precautions for Use

Input operating conditions:

- Attention should be paid to the operating voltage range and the correct polarity (positive and negative terminals).
- To ensure the normal operation of SSRs, the input current should be increased at a low ambient temperature, or reduced at a high ambient temperature.
- When using integrated circuits (ICs) to directly drive SSRs, it is important to ensure the IC has sufficient load capacity and "0" level output as low as possible.

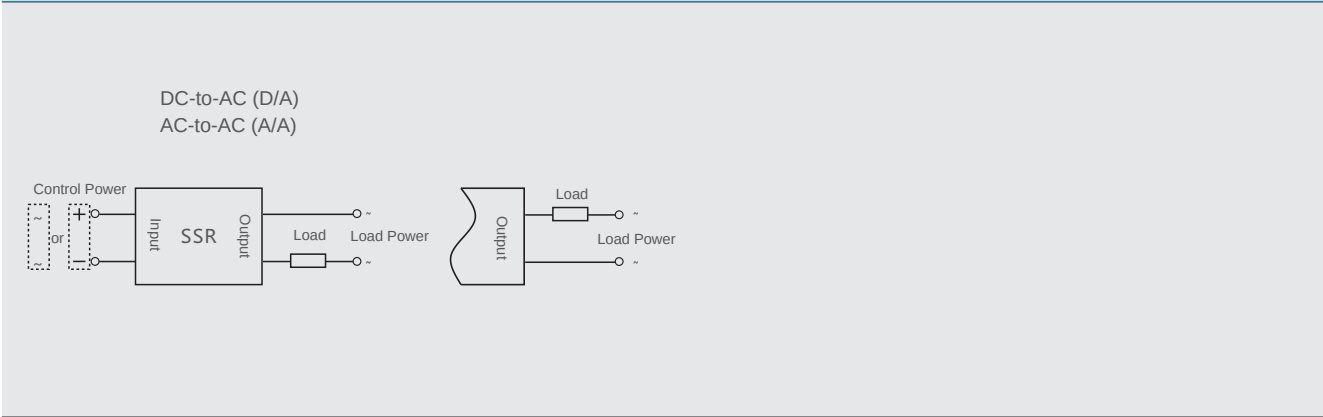
Output Operating Conditions:

- To ensure the reliable operation of SSRs, it is important to use their limit parameters correctly and implement necessary protective measures.
- Selection of peak voltage: inductive load: take 2-3 times the circuit voltage (effective value); pure resistive load: take 1-2 times the circuit voltage (effective value).
- Selection of varistor: The nominal operating voltage of the varistor should be selected according to 1.8-2 times the effective value of the SSR's operating voltage.
- Products with an operating current below 5A should be installed near a heat dissipation window with good ventilation, or where is exposed to the cooling wind.
- Products with an operating current above 5A should be installed with a heatsink. Thermal conductive silicone grease should be applied between the relay and the heatsink to enhance heat dissipation. When the surface temperature of the heatsink approaches 60°C, forced air cooling should be implemented.
- In order to prevent the temperature rise of SSRs from exceeding the allowable value, the heat dissipation effect and installation location should be fully considered during design and application. When installing multiple SSRs side by side, it is required to leave a suitable distance between them.

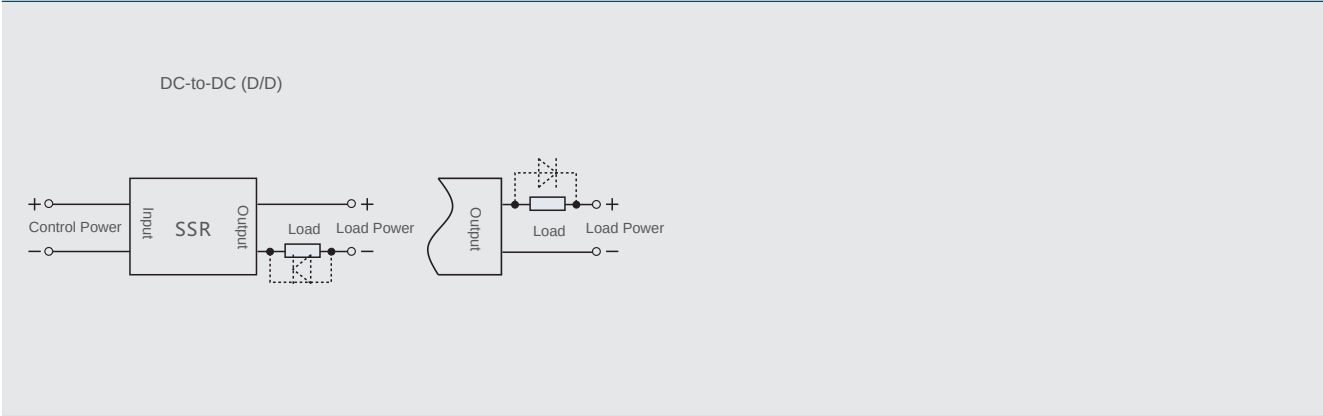
9 Wiring Diagram

Wiring Diagram - Application Circuit

Wiring Diagram for AC SSR



Wiring Diagram for DC SSR

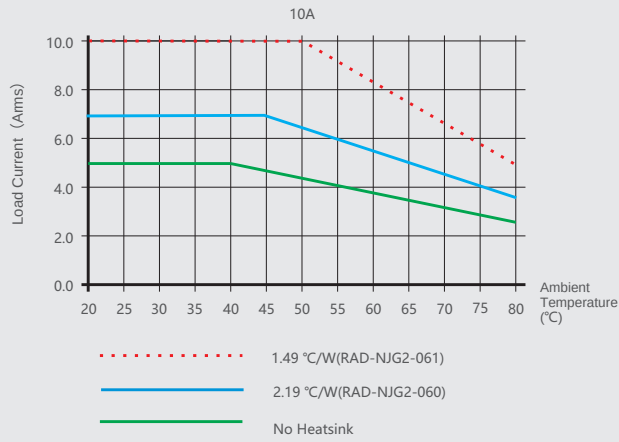


Wiring Diagram for Three-phase SSR

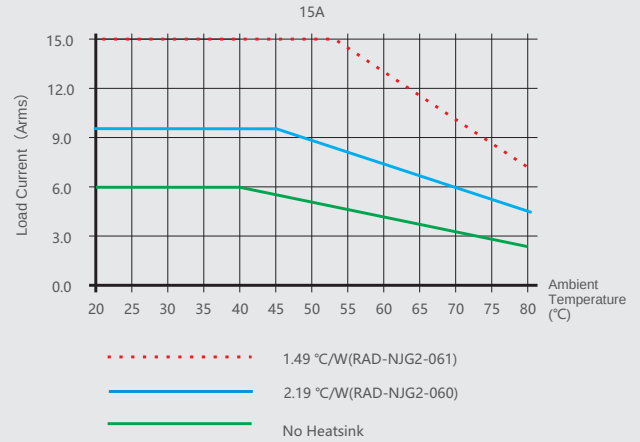


Appendix 1: Characteristic Curve

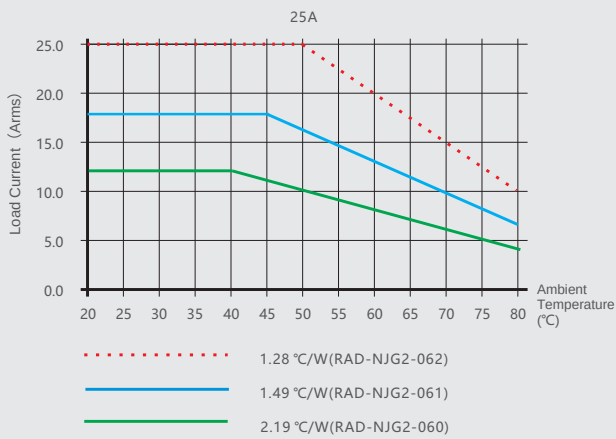
Maximum Load Current & Ambient Temperature Curve (10A)



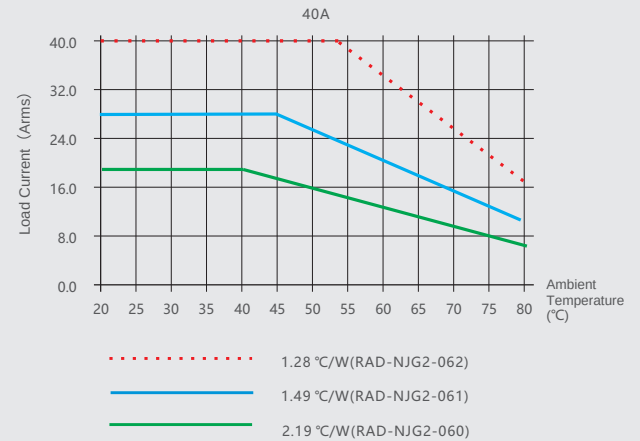
Maximum Load Current & Ambient Temperature Curve (15A)



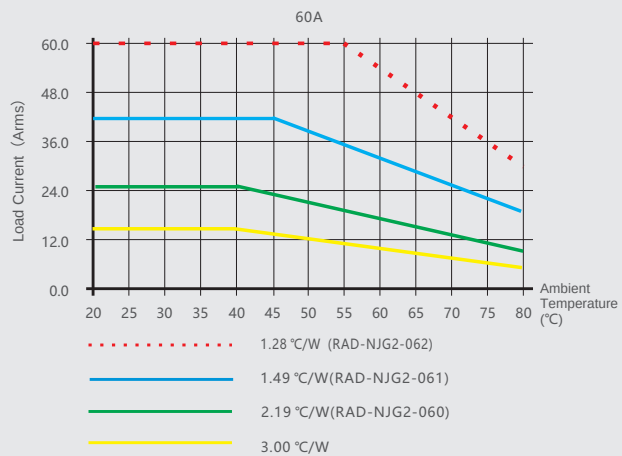
Maximum Load Current & Ambient Temperature Curve (25A)



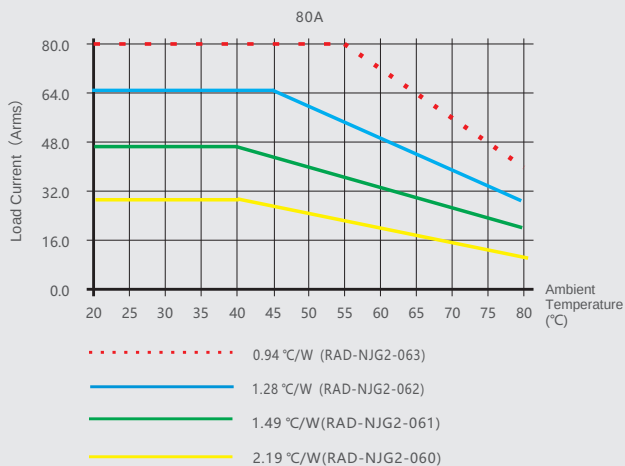
Maximum Load Current & Ambient Temperature Curve (40A)



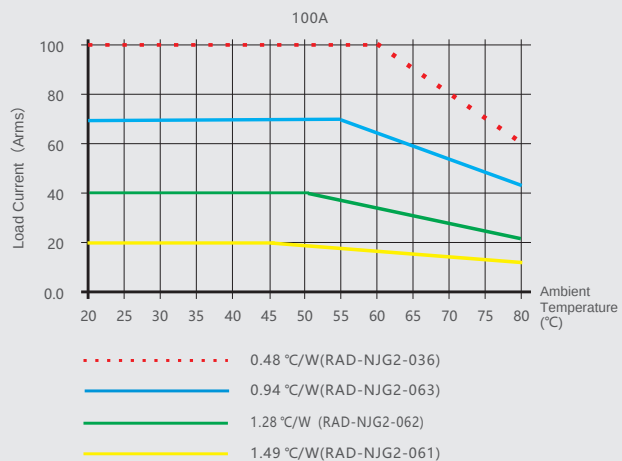
Maximum Load Current & Ambient Temperature Curve (60A)



Maximum Load Current & Ambient Temperature Curve (80A)



Maximum Load Current & Ambient Temperature Curve (100A)



Maximum Load Current & Ambient Temperature Curve (120A)

