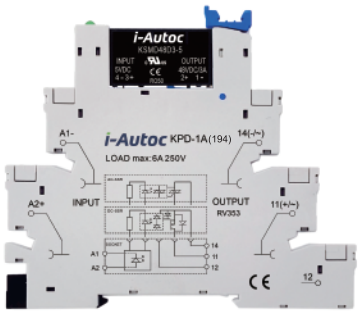
## Product Description

- Transistor or MOSFET Output
- Optical Isolation
- PCB or Socket Mounted
- Load Current: 0.1A, 3A, 4A, 6A
- Load Voltage: 24VDC, 48VDC
- Dielectric Strength: 2500Vrms
- RoHS Compliant




## Product Selection

| KSM | D | 24 | D | 3 | -5 | D |
|---|---|---|---|---|---|---|
| KSM Series | Load Type<br>D: DC Load | Load Voltage<br>24:24VDC<br>48:48VDC | Control Mode<br>D: DC Control | Load Current<br>0.1: 0.1Amp<br>3: 3Amp<br>4: 4Amp<br>6: 6Amp | Control Voltage<br>5: 5VDC<br>12: 12VDC<br>24: 24VDC<br>48: 48VDC<br>60: 60VDC | Socket<br>Blank: Without Socket<br>D: With Socket (1) |

Note: (1) The types of sockets are listed in the table below.

| Socket Model | Socket Type | Applicable Control Voltage |
|---|---|---|
| KPD-1A(194) | Screw Terminal | 5VDC |
| KPD-1A | Screw Terminal | 12VDC/24VDC/48VDC/60VDC |
| KPD-1A-C1 | Spring Terminal | 5VDC |
| KPD-1A-C2 | Spring Terminal | 12VDC/24VDC/48VDC/60VDC |

## Technical Specifications

| Input Specifications (Ta=25°C) | Condition | Symbol | KSMD...3/4/6-5 | | | KSMD...3/4/6-12 | | | KSMD...3/4/6-24 | | | KSMD...3/4/6-48 | | | KSMD...3/4/6-60 | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| Control Voltage(2) | | $U_c$ | 4 | 5 | 6 | 9.6 | 12 | 14.4 | 19.2 | 24 | 28.8 | 38.4 | 48 | 57.6 | 48 | 60 | 72 | VDC |
| Input Current (Typ) | @$U_c$ | $I_c$ | 6.6 | 8.9 | 11.1 | 7.1 | 9.2 | 11.2 | 4.5 | 5.7 | 6.9 | 2.8 | 3.5 | 4.2 | 2.3 | 2.9 | 3.5 | mA |
| Turn-off Voltage | | $U_{c\,off}$ | 1 | | | 2.4 | | | 2.4 | | | 4.8 | | | 4.8 | | | VDC |
| Input Impedance | | | 0.44 | | | 1.19 | | | 4 | | | 13.3 | | | 20 | | | kΩ |

| Input Specifications (Ta=25°C) | Condition | Symbol | KSMD...0.1-5 | | | KSMD...0.1-12 | | | KSMD...0.1-24 | | | KSMD...0.1-48 | | | KSMD...0.1-60 | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| Control Voltage(2) | | $U_c$ | 4 | 5 | 6 | 9.6 | 12 | 14.4 | 19.2 | 24 | 28.8 | 38.4 | 48 | 57.6 | 48 | 60 | 72 | VDC |
| Input Current (Typ) | @$U_c$ | $I_c$ | 6.7 | 9.1 | 11.4 | 5.6 | 7.2 | 8.8 | 6 | 7.6 | 9.2 | 3.8 | 4.7 | 5.7 | 3.1 | 3.8 | 4.6 | mA |
| Turn-off Voltage | | $U_{c\,off}$ | 1 | | | 2.4 | | | 2.4 | | | 4.8 | | | 4.8 | | | VDC |
| Input Impedance | | | 0.43 | | | 1.51 | | | 3 | | | 9.9 | | | 15.3 | | | kΩ |

Note: (2) For KSMD with control voltage at 12V, 24V, 48V, 60V that operating with the socket, the minimum control voltage should increase 1.4V.
For example, for KSMD24D2-12D, please ensure that the minimum control voltage is 9.6V+1.4V=11V Min

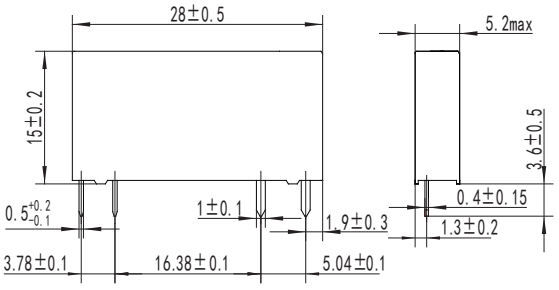
| Output Specifications (Ta=25°C) | Condition | Symbol | Model | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| Load Voltage | | $U_e$ | 24V | 3 | 24 | 30 | VDC |
| | | | 48V | 3 | 48 | 58 | VDC |
| Load Current | | $I_e$ | 0.1A | 0.001 | | 0.1 | A |
| | | | 3A | 0.002 | | 3 | A |
| | | | 4A | 0.002 | | 4 | A |
| | | | 6A | 0.002 | | 6 | A |
| Turn-on Time | | $t_{on}$ | | | | 300 | μs |
| Turn-off Time | | $t_{off}$ | | | | 300 | μs |
| Off-State Leakage Current | @ Rated Load Voltage | $I_{lk}$ | | | | 100 | μA |
| On-State Voltage Drop | @ Rated Load Current | $U_d$ | 0.1A | | 0.75 | 1.5 | V |
| On-state Resistance | @Tj=25°C | $R_d$ | 3A/4A | | 16 | | mΩ |
| | @Tj=125°C | | | | | 37 | mΩ |
| | @Tj=25°C | | 6A | | 10 | | mΩ |
| | @Tj=125°C | | | | | 20 | mΩ |
| TVS Breakdown Voltage | @1mA | | 24V | 37 | 39 | 41 | VDC |
| | | | 48V | 64.6 | 68 | 71.4 | VDC |
| MOSFET Transient Overvoltage | | $U_p$ | 24V | | 75 | | Vpk |
| | | | 48V | | 100 | | Vpk |
| Non-repetitive Surge Current | @10ms | $I_{TSM}$ | 0.1A | | 1 | | Apk |
| | | | 3A | | 30 | | Apk |
| | | | 4A | | 48 | | Apk |
| | | | 6A | | 60 | | Apk |

| General Specifications (Ta=25°C) | Condition | Symbol | Model | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| Dielectric Strength | 50/60Hz, Input/Output | $V_{ISO}$ | | | 2500 | | Vrms |
| Insulation Resistance | @500VDC, Input/Output | $R_{ISO}$ | | | 1000 | | MΩ |
| Ambient Temperature Range | | $T_{OPR}$ | | -30 | | +80 | ℃ |
| Storage Temperature Range | | $T_{SPR}$ | | -30 | | +100 | ℃ |
| Weight | | | Without Socket | | 4 | | g |
| | | | With Socket | | 30 | | g |

## Applications

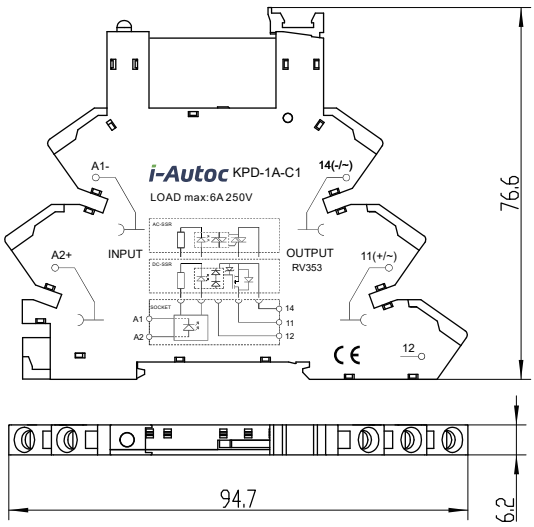
Suitable for high density PCB mounted, PLC control applications, and etc.

## Outline Dimensions

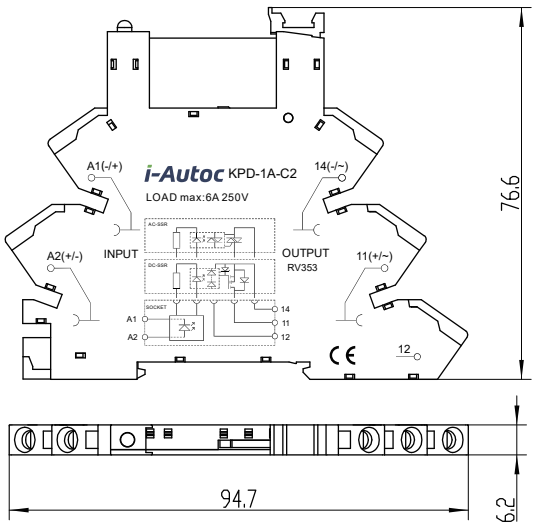



KSMD SSR

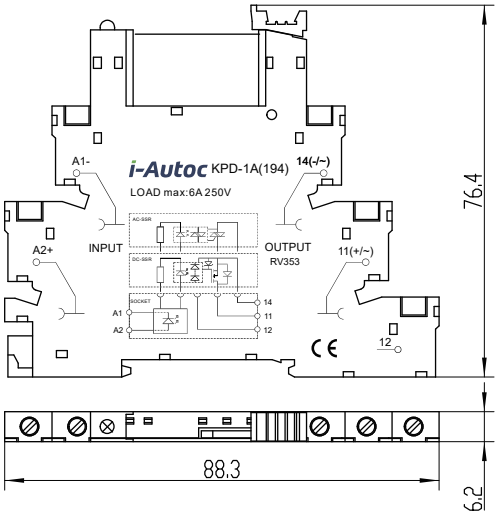
## Outline Dimensions



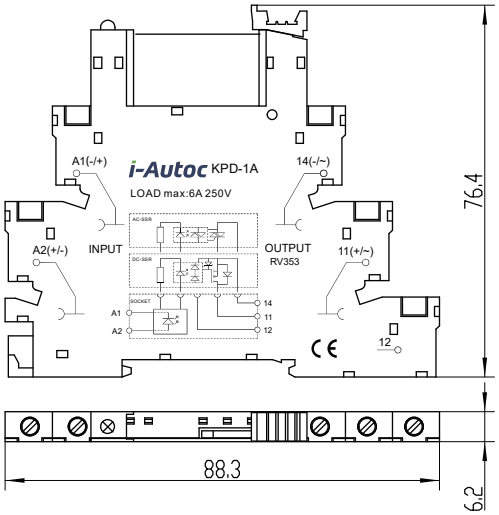

KSMD+KPD-1A-C1




KSMD+KPD-1A-C2

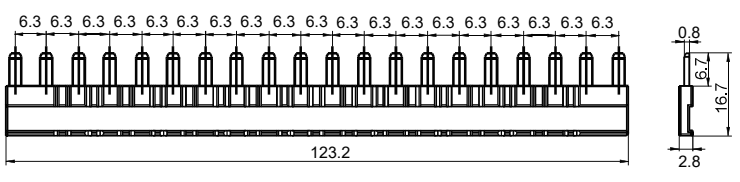



KSMD+KPD-1A(194)



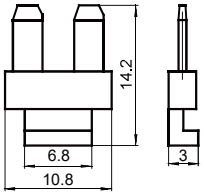

KSMD+KPD-1A

## Jumper Strap Dimensions



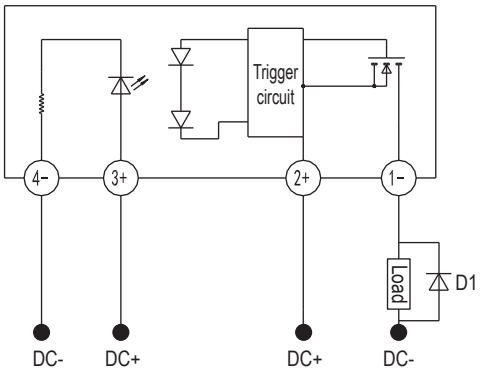




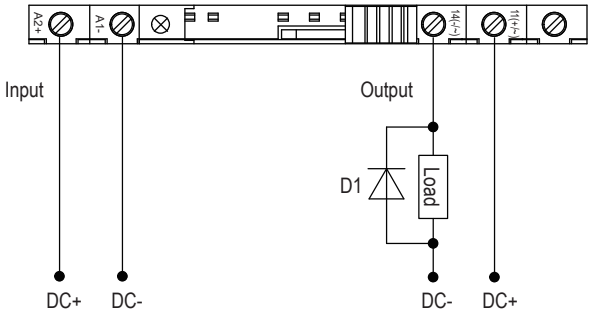


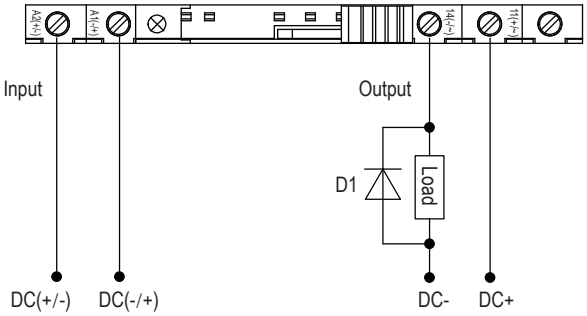
## Wiring Diagram




SSR




KSMD...-5D

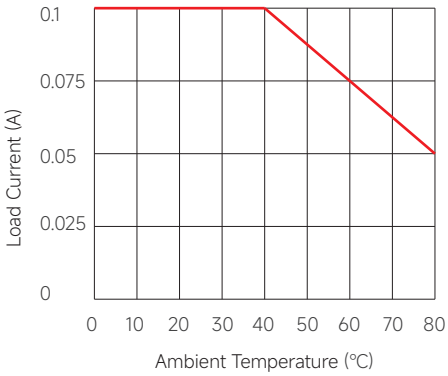



KSMD...-12/24/48/60D

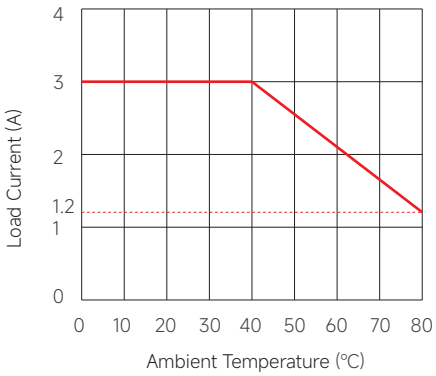
Note: When the relay is used for inductive load control, please be sure to use a suppression circuit, just like the drawing above. Both load terminals are inverse anti-paralleled with a fly-wheel diode D1. D1: Fast Recovery Diode

## Thermal Derating Curve

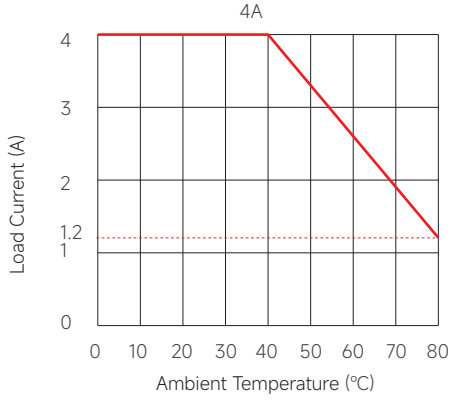
0.1A



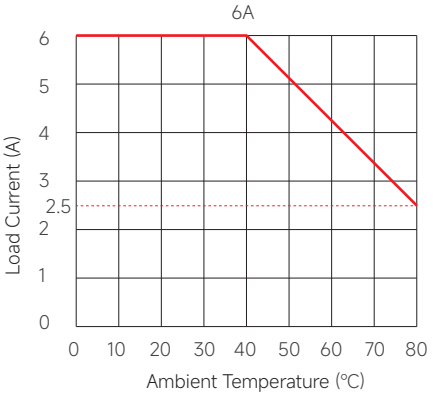

3A




4A




6A



## Installation Instructions

1. Install the relay
Set the blue clip of socket in the open state (see Figure 1), and insert the relay into the socket cavity (see Figure 2). Then press the relay down until the relay is fully installed in the socket (see Figure 3).

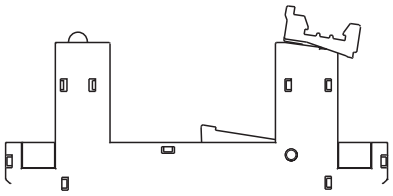


Figure 1

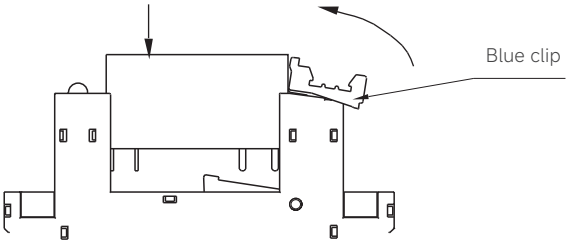



Figure 2

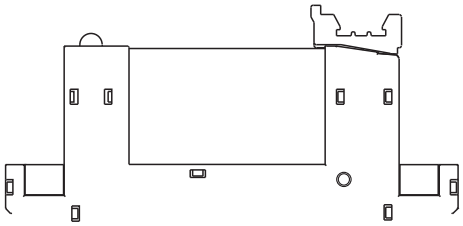


Figure 3

2. Remove the relay
Pull the blue clip of socket to remove the relay (see Figure 4-6).
Note: When disassembling the relay, in order to prevent the relay from being ejected and causing it to fall, please be sure to hold the relay and then pull the blue clip to remove the relay.

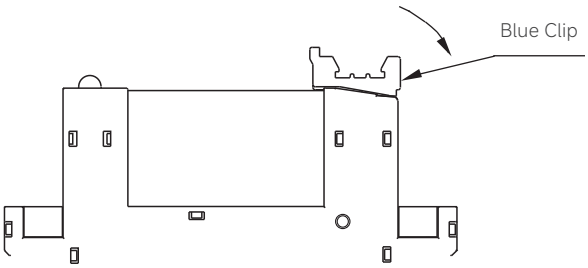



Figure 4

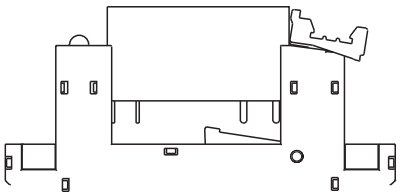


Figure 5

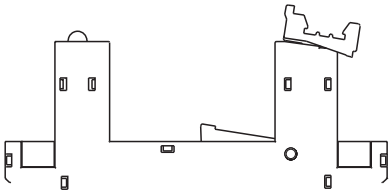


Figure 6

3. Install the socket
Insert part A of the socket into the din-rail first, and then press the socket down in the direction of the arrow(see Figure 7).

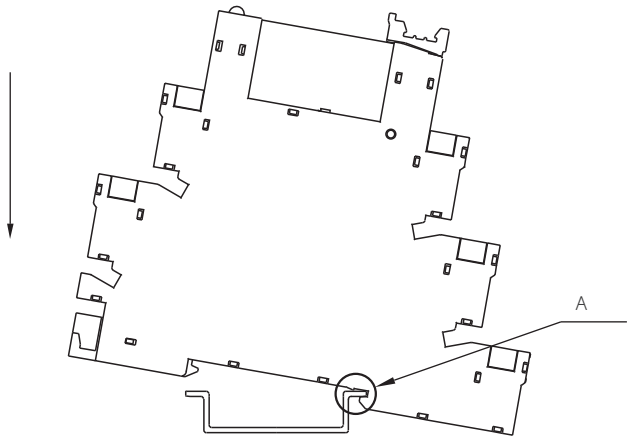



Figure 7

4. Remove the socket
Insert a proper size screwdriver into part B of the socket, turn the screwdriver in the direction of the arrow, and then remove the socket (see Figure 8).

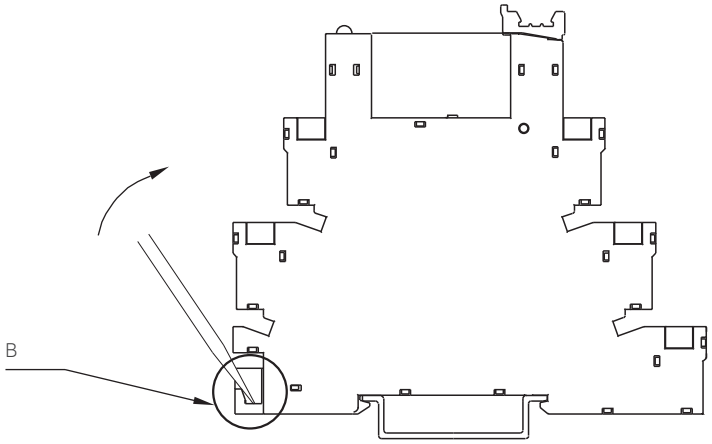



Figure 8

## General Notes

1. Soldering must be finished within 10 seconds at 260℃, or finished within 5 seconds at 350℃. Otherwise, it may cause damage to the relay.
2. Terminal polarity must be observed. Otherwise, it may cause damage to the relay.
3. When the ambient temperature of the product is high, derate the product according to the temperature curve.
4. Capacitive load will produce very high surge current at the moment of conduction, which may lead to the damage of solid state relay due to the excessive surge current. Therefore, if the actual load is capacitive, or the load has paralleled large capacitance, it is strongly recommended that NTC should be connected in series in the load loop to suppress surge current in order to avoid damage to the product.

## ! Warnings

1. The product's may become hot during operation, allow it to cool before touching.
2. Disconnect all power before installing or working with this equipment.
3. Verify all connections and replace all covers before turning on power.

## Certification Standards

| Certification | Test Standard |
|---|---|
| UL | UL508 |
| | C22.2 No. 14-13 |
| CE | EN 60947-1:2007/A2:2014 |
| | EN 60947-5-1:2017 |
| TUV | EN 60947-1:2007/A2:2014 |
| | EN 60947-5-1:2017 |