S112S01 Series
S116S01 Series

SIP Type SSR for Medium Power Control

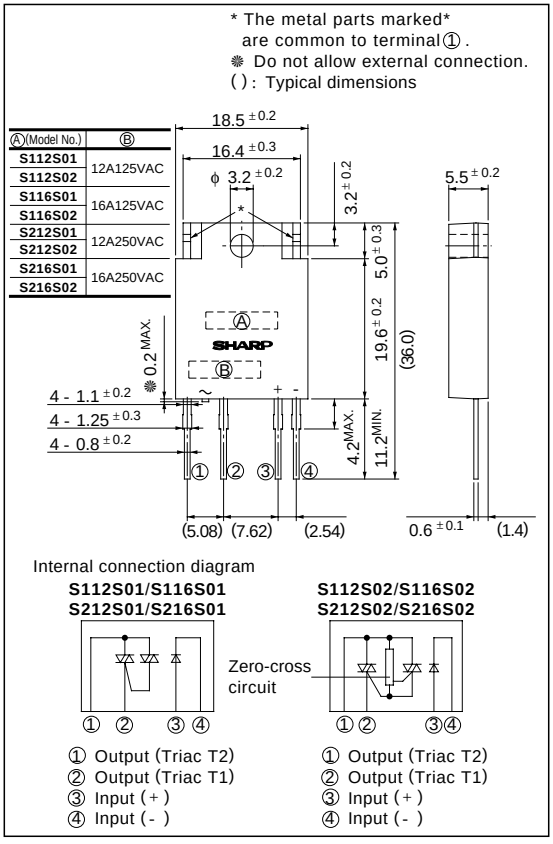
■ Features

1. Compact, high radiation resin mold package
2. RMS ON-state current
   S112S01 Series: 12Arms at T_C <= 70˚C
   (With heat sink)
   S116S01 Series: 16Arms at T_C <= 60˚C
   (With heat sink)
3. Built-in zero-cross circuit
   (S112S02 / S212S02 / S116S02 / S216S02)
4. High repetitive peak OFF-state voltage
   S112S01/ S112S02 / S116S01 / S116S02
   V_{DRM} : 400V
   S212S01 / S212S02 / S216S01 / S216S02
   V_{DRM} : 600V
5. Isolation voltage between input and output
   (V_{iso} : 4 000V_{rms})
6. Recognized by UL, file No. E94758
   S112S01 / S112S02
   S116S01 / S116S02
7. Approved by CSA, No. 63705
   S112S01 / S112S02
   S116S01 / S116S02

■ Applications

1. Copiers, laser beam printers
2. Automatic vending machines
3. FA equipment

■ Outline Dimensions (Unit : mm)



■ Model line-ups

	For 100V lines	For 200V lines
For phase control No built-in zero-cross circuit	**S112S01** **S116S01**	**S212S01** **S216S01**
Built-in zero-cross circuit	**S112S02** **S116S02**	**S212S02** **S216S02**

■ Absolute Maximum Ratings (Ta = 25˚C)

Parameter			Symbol	Rating	Unit
Input	Forward current		I_F	50	mA
	Reverse voltage		V_R	6	V
Output	RMS ON-state current	**S112S01 Series**	I_T	*4 12	A_{rms}
		S116S01 Series		*5 16	A_{rms}
	*1 Peak one cycle surge current	**S112S01 Series**	I_{surge}	120	A
		S116S01 Series		160	A
	Repetitive peak OFF-state voltage	**S112S01 / S112S02 S116S01 / S116S02**	V_{DRM}	400	V
		S212S01 / S212S02 S216S01 / S216S02		600	V
	Non-repetitive peak OFF-state voltage	**S112S01 / S112S02 S116S01 / S116S02**	V_{DSM}	400	V
		S212S01 / S212S02 S216S01 / S216S02		600	V
	Critical rate of rise of ON-state current		dI/dt	50	A/μ s
	Operating frequency		f	45 to 65	Hz
*2 Isolation voltage			V_{iso}	4 000	V_{rms}
Operating temperature			T_{opr}	- 25 to + 100	˚C
Storage temperature			T_{stg}	- 30 to + 125	˚C
*3 Soldering temperature			T_{sol}	260	˚C

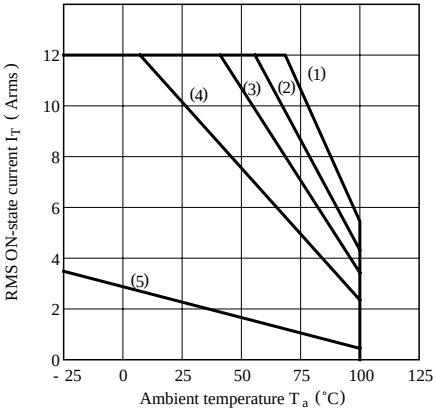
*1 AC 60Hz sine wave, T_j = 25˚C start
*2 AC 60Hz for 1 minute, 40 to 60 % RH. Apply voltages between input and output by the dielectric withstand voltage tester with zero-cross circuit. (Input and output shall be shorted respectively). (Note) When the isolation voltage is necessary at using external heat sink, please use the insulation sheet.
*3 For 10 seconds
*4 T_C<=70˚C
*5 T_C<=60˚C

■ Electrical Characteristics (Ta = 25˚C)

Parameter			Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage		V_F	I_F = 20mA	-	1.2	1.4	V
	Reverse current		I_R	V_R = 3V	-	-	10^{-4}	A
Output	Repetitive peak OFF-state current		I_{DRM}	$V_D = V_{DRM}$	-	-	10^{-4}	A
	ON-state voltage	**S112S01 Series**	V_T	Resistance load I_F= 20mA, I_T= 12Arms	-	-	1.5	V_{rms}
		S116S01 Series		Resistance load I_F= 20mA, I_T= 16Arms	-	-	1.5	V_{rms}
	Holding current		I_H	-	-	-	50	mA
	Critical rate of rise of OFF-state voltage		dV/dt	V_D = 2/3 • V_{DRM}	30	-	-	V/μ s
	Critical rate of rise of commutating OFF-state voltage		$(dV/dt)_C$	T_j = 125˚C, V_D = 400V, *6	5	-	-	V/μ s
	Zero-cross voltage	**S112S02 / S212S02 S116S02 / S216S02**	V_{OX}	I_F = 8mA	-	-	35	V
Transfer characteristics	Minimum trigger current	**S112S01 / S212S01 S116S01 / S216S01**	I_{FT}	V_D = 12V, R_L= 30 Ω	-	-	8	mA
		S112S02 / S212S02 S116S02 / S216S02		V_D = 6V, R_L= 30 Ω	-	-	8	mA
	Isolation resistance		R_{ISO}	DC500V, RH = 40 to 60 %	10^{10}	-	-	Ω
	Turn-on time	**S112S01 / S212S01 S116S01 / S216S01**	t_{on}	AC 50Hz	-	-	1	ms
		S112S02 / S212S02 S116S02 / S216S02			-	-	10	ms
	Turn-off time		t_{off}	AC 50Hz	-	-	10	ms
Thermal resistance (Between junction and case)		**S112S01 series**	$R_{th(j-c)}$	-	-	3.8	-	˚C/W
		S116S01 series		-	-	3.3	-	˚C/W
Thermal resistance (Between junction and ambience)			$R_{th(j-a)}$	-	-	40	-	˚C/W

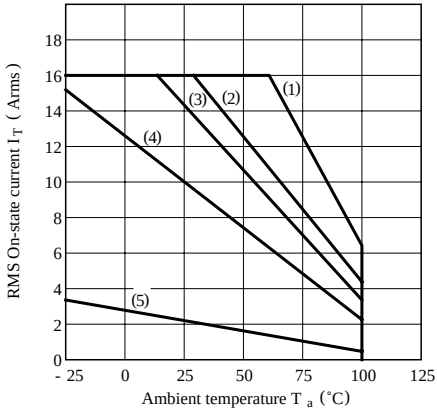
*6 **S112S01 Series**: dI_T/dt = - 6A/ms
S116S01 Series: dI_T/dt = - 8A/ms

Fig. 1 RMS ON-state Current vs. Ambient Temperature (S112S01Series)



(1) With infinite heat sink
(2) With heat sink (280 x 280 x 2 mm Al plate)
(3) With heat sink (200 x 200 x 2 mm Al plate)
(4) With heat sink (100 x 100 x 2 mm Al plate)
(5) Without heat sink

Fig. 2 RMS ON-state Current vs. Ambient Temperature (S116S01Series)



(1) With infinite heat sink
(2) With heat sink (280 x 280 x 2 mm Al plate)
(3) With heat sink (200 x 200 x 2 mm Al plate)
(4) With heat sink (100 x 100 x 2 mm Al plate)
(5) Without heat sink

(Note) With the Al heat sink set up vertically,tighten the device at the center of the Al heat sink with a torque of 0.4N • m and apply thermal conductive silicone grease on the heat sink mounting plate. Forcible cooling shall not be carried out.

Fig. 3 RMS ON-state Current vs. Case Temperature

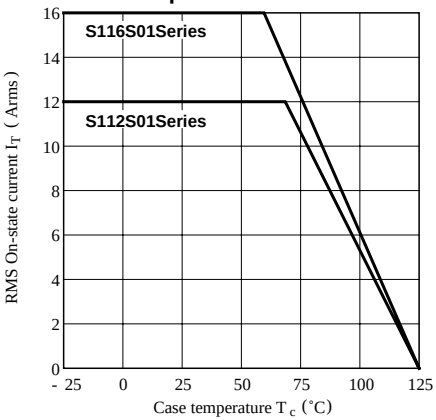


Fig. 4 Forward Current vs. Ambient Temperature

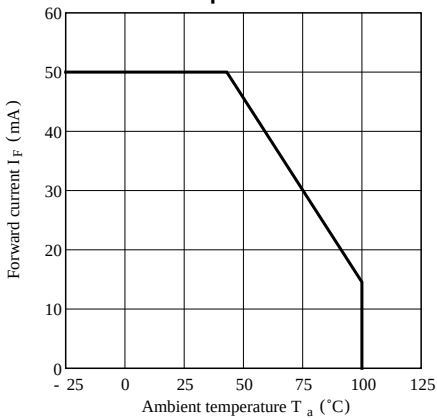


Fig. 5 Forward Current vs. Forward Voltage

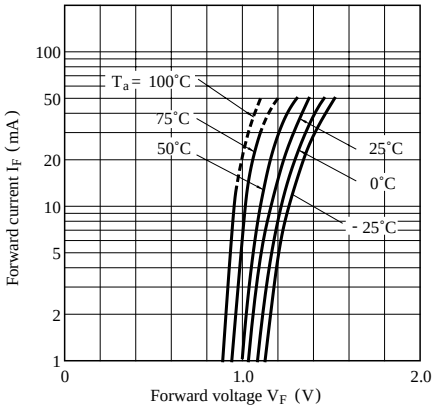


Fig. 6 Surge Current vs. Power-on Cycle

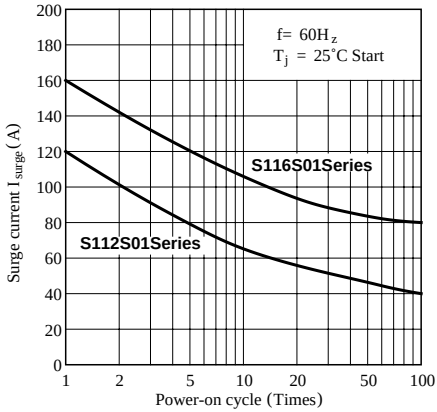


Fig. 7 Maximum ON-state Power Dissipation vs. RMS ON-state Current (S112S01Series)

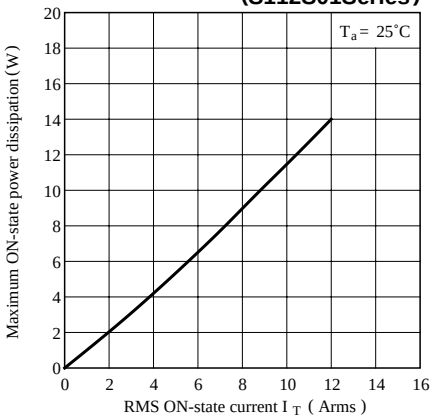


Fig. 8 Maximum ON-state Power Dissipation vs. RMS ON-state Current (S116S01Series)

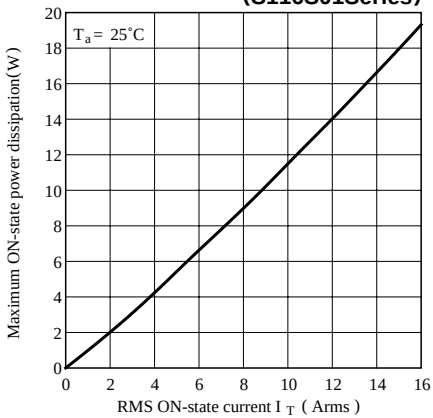


Fig. 9 Minimum Trigger Current vs. Ambient Temperature

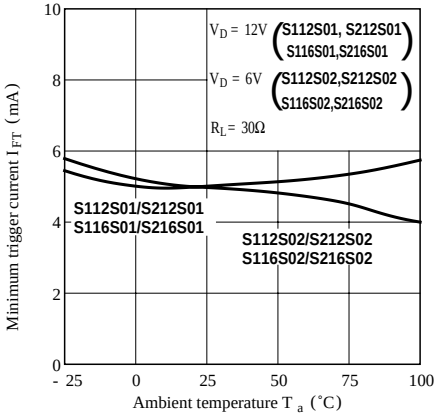


Fig.10 Repetitive Peak OFF-state Current vs. Ambient Temperature (S112S01/ S112S02/ S116S01/ S116S02)

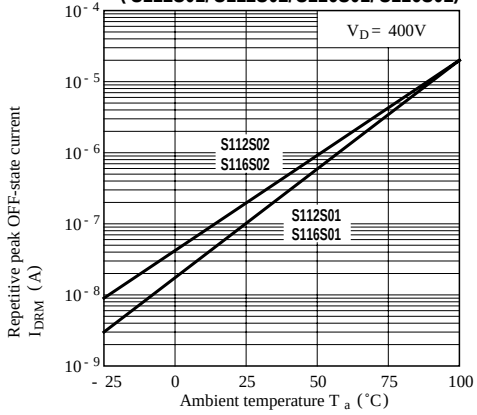
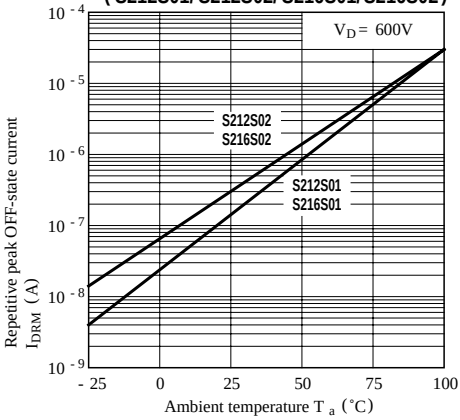


Fig.11 Repetitive Peak OFF-state Current vs. Ambient Temperature (S212S01/S212S02/S216S01/S216S02)



● Please refer to the chapter " Precautions for Use."

NOTICE

- The circuit application examples in this publication are provided to explain representative applications of SHARP devices and are not intended to guarantee any circuit design or license any intellectual property rights. SHARP takes no responsibility for any problems related to any intellectual property right of a third party resulting from the use of SHARP's devices.
- Contact SHARP in order to obtain the latest device specification sheets before using any SHARP device. SHARP reserves the right to make changes in the specifications, characteristics, data, materials, structure, and other contents described herein at any time without notice in order to improve design or reliability. Manufacturing locations are also subject to change without notice.
- Observe the following points when using any devices in this publication. SHARP takes no responsibility for damage caused by improper use of the devices which does not meet the conditions and absolute maximum ratings to be used specified in the relevant specification sheet nor meet the following conditions:

(i) The devices in this publication are designed for use in general electronic equipment designs such as:
— Personal computers
— Office automation equipment
— Telecommunication equipment [terminal]
— Test and measurement equipment
— Industrial control
— Audio visual equipment
— Consumer electronics

(ii) Measures such as fail-safe function and redundant design should be taken to ensure reliability and safety when SHARP devices are used for or in connection with equipment that requires higher reliability such as:
— Transportation control and safety equipment (i.e., aircraft, trains, automobiles, etc.)
— Traffic signals
— Gas leakage sensor breakers
— Alarm equipment
— Various safety devices, etc.

(iii) SHARP devices shall not be used for or in connection with equipment that requires an extremely high level of reliability and safety such as:
— Space applications
— Telecommunication equipment [trunk lines]
— Nuclear power control equipment
— Medical and other life support equipment (e.g., scuba).

- Contact a SHARP representative in advance when intending to use SHARP devices for any "specific" applications other than those recommended by SHARP or when it is unclear which category mentioned above controls the intended use.
- If the SHARP devices listed in this publication fall within the scope of strategic products described in the Foreign Exchange and Foreign Trade Control Law of Japan, it is necessary to obtain approval to export such SHARP devices.
-
- Contact and consult with a SHARP representative if there are any questions about the contents of this publication.