S112S01 Series S116S01 Series

SIP Type SSR for Medium Power Control

■ Features

Compact, high radiation resin mold package

2. RMS ON-state current

S112S01 Series: 12Arms at $T_C \le 70^{\circ}C$

(With heat sink)

S116S01 Series: $16 \text{Arms at } T_C \le 60^{\circ} \text{C}$

(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

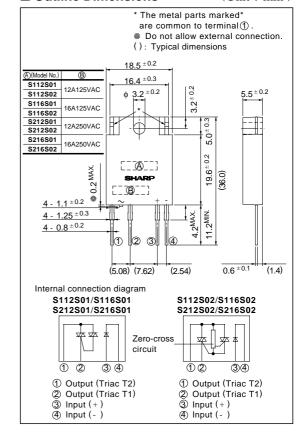
S112S01 / S112S02 S116S01 / S116S02

■ Applications

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

■ Outline Dimensions

(Unit: mm)



■ Model line-ups

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

■ Absolute Maximum Ratings

 $(Ta = 25^{\circ}C)$

Parameter			Symbol	Rating	Unit		
Input	Forward current		I_F	50	mA	_	
	Reverse voltage	V _R	6	V			
Output	RMS ON-state	S112S01 Series	I_{T}	*412	A _{rms}		
	current	S116S01 Series		*516	A _{rms}	— *1 AC 60Hz si:	
	*1Peak one cycle surge current	S112S01 Series		120	A	start	
		S116S01 Series	I surge	160	A	*2 AC 60Hz for	
	Repetitive peak OFF-state voltage	S112S01 / S112S02 S116S01 / S116S02	V _{DRM}	400	V	% RH. Applyinput and ou	
		S212S01 / S212S02 S216S01 / S216S02		600	V	dielectric wi	
	Non-repetitive peak OFF-state voltage	S112S01 / S112S02 S116S01 / S116S02	$V_{ m DSM}$	400	V	tester with z (Input and ou ed respective	
		S212S01 / S212S02 S216S01 / S216S02		600	V		
	Critical rate of rise of ON-state current		dI/dt	50	A/μ s	(Note) When the iso	
	Operating frequency		f	45 to 65	Hz		
	*2 Isolation voltage			4 000	V _{rms}	 necessary at heat sink, ple 	
	Operating temperature			- 25 to + 100	°C	sulation she	
	Storage temperature			- 30 to + 125	°C	*3 For 10 secon -*4 T _C <=70°C *5 T _C <=60°C	
	*3Soldering temperature			260	°C		

- *1 AC 60Hz sine wave, $T_i = 25^{\circ}C$
- *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 in-

sulation sheet. *3 For 10 seconds *4 T_C<=70°C

■ Electrical Characteristics

 $(Ta = 25^{\circ}C)$

	Paramete	er	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
T4	Forward voltage		V_F	$I_F = 20 \text{mA}$	-	1.2	1.4	V
Input	Reverse current		I_R	$V_R = 3V$	-	-	10-4	A
Output	Repetitive peak OFF-state current		I_{DRM}	$V_D = V_{DRM}$	-	-	10-4	Α
	S112S01 Series		37	Resistance load $I_F = 20mA$, $I_T = 12Arms$	-	-	1.5	V _{rms}
	ON-state voltage	S116S01 Series	V _T	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	$V_D = 2/3 \cdot V_{DRM}$	30	-	-	V/μ s
	Critical rate of rise OFF-state voltage	of commutating	(dV/dt) _C	$T_j = 125^{\circ}C, V_D = 400V, *6$	5	-	-	V/μ s
	Zero-cross voltage	S112S02 / S212S02 S116S02 / S216S02	V _{ox}	$I_F=8mA \\$	-	-	35	V
Transfer charac- teristics	Minimum trigger	S112S01 / S212S01 S116S01 / S216S01	I _{FT}	$V_D = 12V$, $R_L = 30 \Omega$	-	-	8	mA
	current	S112S02 / S212S02 S116S02 / S216S02		$V_D = 6V$, $R_L = 30 \Omega$	-	-	8	mA
	Isolation resistance		R _{ISO}	DC500V, RH = $40 \text{ to } 60 \%$	1010	-	-	Ω
	Turn-on time S112S01 / S212S01 / S16S01 / S216S01 / S112S02 / S212S02 / S116S02 / S216S02	t _{on}	AC 50Hz	-	-	1	ms	
				-	-	10	ms	
	Turn-off time		$t_{ m off}$	AC 50Hz	-	-	10	ms
Thermal resistance S112S01 series (Between junction and case) S116S01 series		R th(j - c)	-	-	3.8	-	°C/W	
			-	-	3.3	-	°C/W	
Thermal re	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)

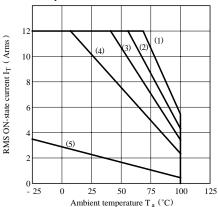
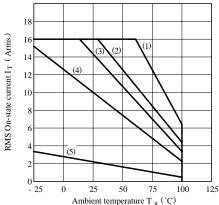


Fig. 2 RMS ON-state Current vs. Ambient Temperature (S116S01Series)



- (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

- (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

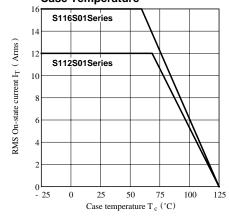


Fig. 4 Forward Current vs.

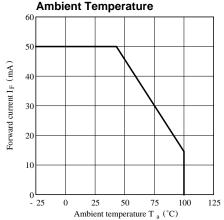


Fig. 5 Forward Current vs. Forward Voltage

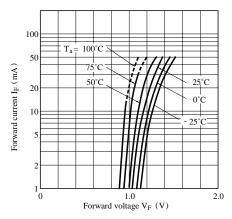


Fig. 7 Maximum ON-state Power Dissipation vs. RMS ON-state Current

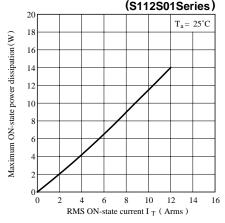


Fig. 9 Minimum Trigger Current vs.
Ambient Temperature

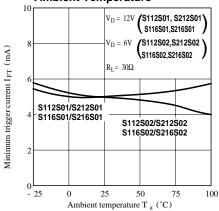


Fig. 6 Surge Current vs. Power-on Cycle

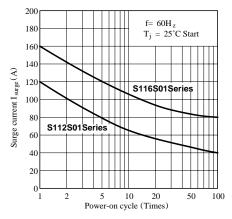


Fig. 8 Maximum ON-state Power
Dissipation vs. RMS ON-state Current
(S116S01Series)

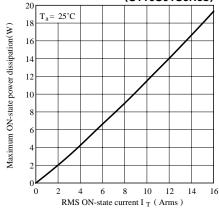


Fig.10 Repetitive Peak OFF-state Current vs. Ambient Temperature

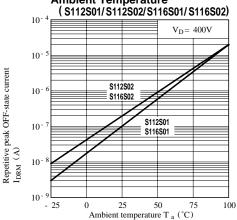
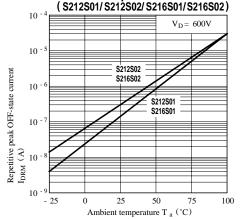




Fig.11 Repetitive Peak OFF-state Current vs. Ambient Temperature (\$212\$01/\$212\$02/\$216\$01/\$216\$02)



• 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.
- •This publication is the proprietary product of SHARP and is copyrighted, with all rights reserved. Under the copyright laws, no part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, in whole or in part, without the express written permission of SHARP. Express written permission is also required before any use of this publication may be made by a third party.
- Contact and consult with a SHARP representative if there are any questions about the contents of this
 publication.