

S112S01 Series S116S01 Series

SIP Type SSR for Medium Power Control

■ Features

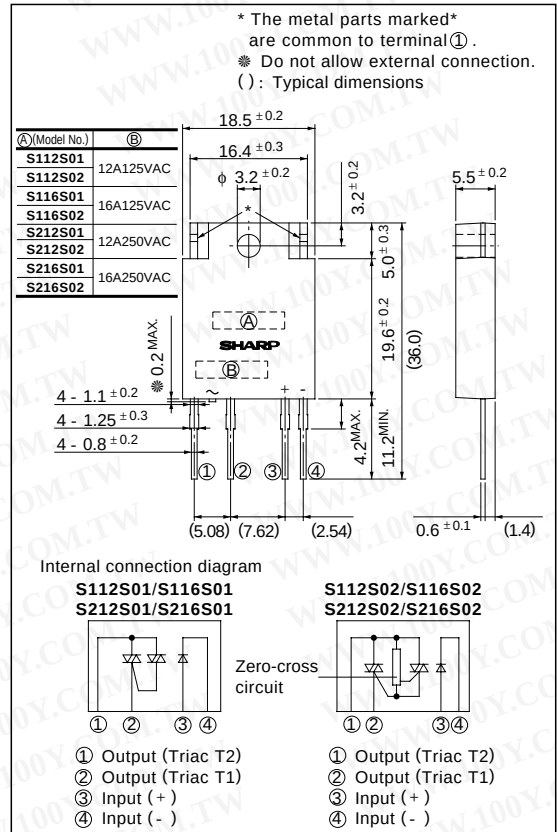
1. Compact, high radiation resin mold package
2. RMS ON-state current
S112S01 Series: 12Arms at $T_c \leq 70^\circ\text{C}$
 (With heat sink)
S116S01 Series: 16Arms at $T_c \leq 60^\circ\text{C}$
 (With heat sink)
3. Built-in zero-cross circuit
(S112S02 / S212S02 / S116S02 / S216S02)
4. High repetitive peak OFF-state voltage
S112S01 / S112S02 / S116S01 / S116S02
 $V_{\text{DRM}} : 400\text{V}$
S212S01 / S212S02 / S216S01 / S216S02
 $V_{\text{DRM}} : 600\text{V}$
5. Isolation voltage between input and output
 $(V_{\text{iso}} : 4\,000V_{\text{rms}})$
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	S112S01	S212S01
No built-in zero-cross circuit	S116S01	S216S01
Built-in zero-cross circuit	S112S02	S212S02
	S116S02	S216S02

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■ 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	I_T	*412	A _{rms}
			*516	A _{rms}
	*1 Peak one cycle surge current	I_{surge}	120	A
			160	A
	Repetitive peak OFF-state voltage	V_{DRM}	400	V
			600	V
	Non-repetitive peak OFF-state voltage	V_{DSM}	400	V
			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, $T_j = 25^\circ\text{C}$ 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 $T_C \leq 70^\circ\text{C}$ *5 $T_C \leq 60^\circ\text{C}$

■ Electrical Characteristics

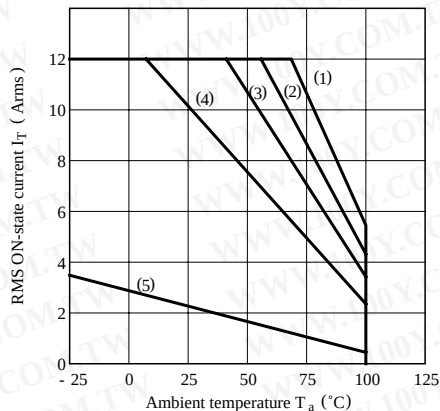
(Ta = 25°C)

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 S116S01 series	R _{th(j - c)}	-	-	3.8	°C/W	
				-	-	3.3	°C/W	
Thermal resistance (Between junction and ambience)			R _{th(j - a)}	-	-	40	°C/W	

*6 S112S01 Series: $dI_T/dt = -6\text{A/ms}$ S116S01 Series: $dI_T/dt = -8\text{A/ms}$

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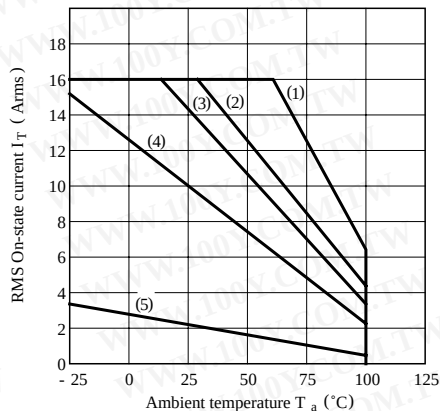
Fig. 1 RMS ON-state Current vs. Ambient Temperature (S112S01Series)



- (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

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

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

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

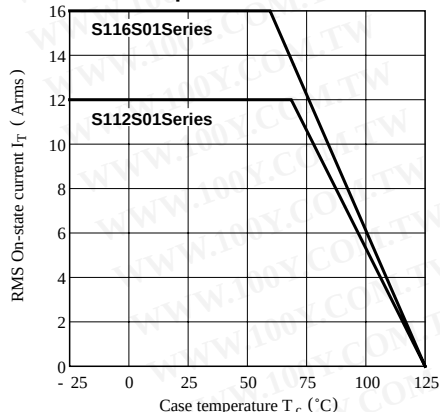


Fig. 4 Forward Current vs. Ambient Temperature

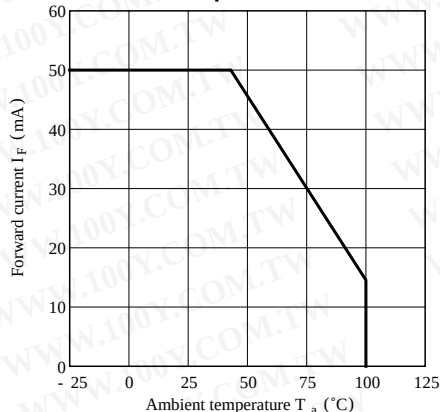


Fig. 5 Forward Current vs. Forward Voltage

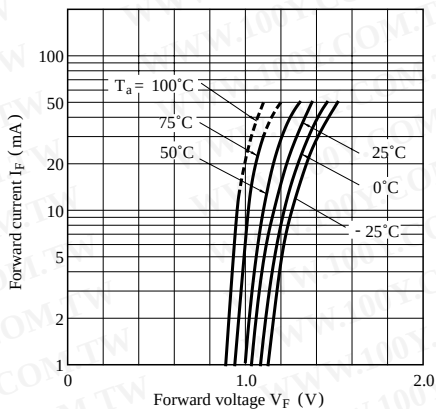


Fig. 6 Surge Current vs. Power-on Cycle

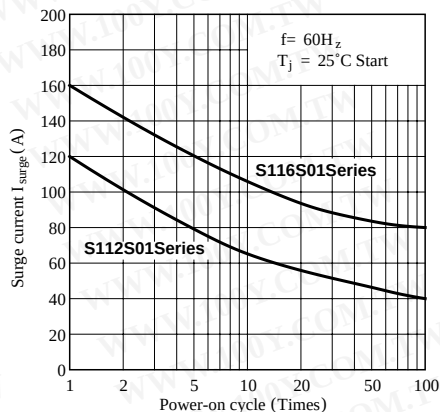


Fig. 7 Maximum ON-state Power Dissipation vs. RMS ON-state Current (S112S01Series)

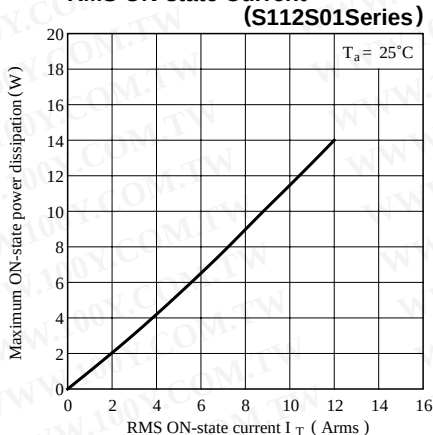


Fig. 8 Maximum ON-state Power Dissipation vs. RMS ON-state Current (S116S01Series)

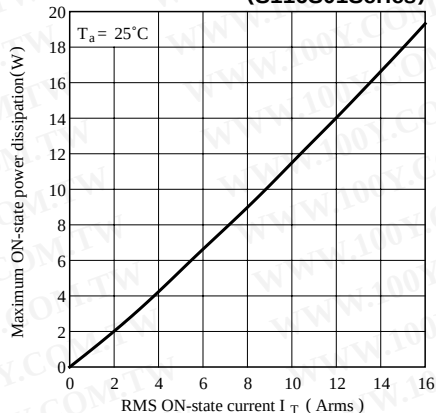


Fig. 9 Minimum Trigger Current vs. Ambient Temperature

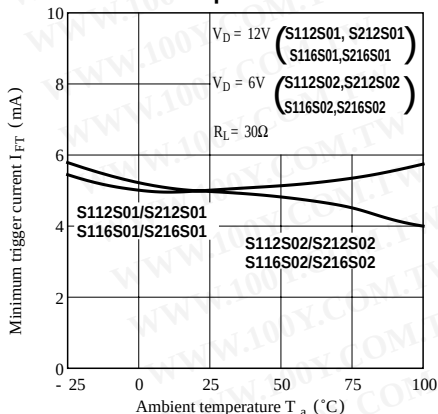


Fig.10 Repetitive Peak OFF-state Current vs. Ambient Temperature (S112S01/S112S02/S116S01/S116S02)

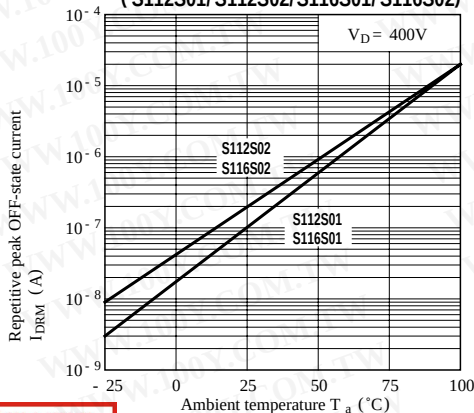
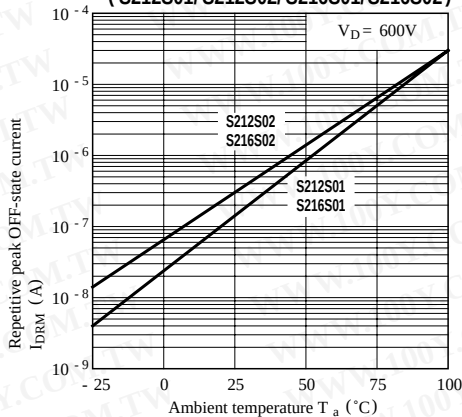


**Fig.11 Repetitive Peak OFF-state Current vs.
Ambient Temperature
(S212S01/ S212S02/ S216S01/ S216S02)**



● Please refer to the chapter “Precautions for Use.”

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