

# S102S11/S102S12 S202S11/S202S12

## SIP Type SSR with Snubber Circuit and Mousing Capability for External Heat Sink

### ■ Features

1. High radiation resin mold package
2. Built-in snubber circuit
3. Built-in zero-cross circuit  
(S102S12/S202S12)
4. High repetitive peak OFF-state voltage  
S102S11/S102S12  $V_{DRM} : 400V$   
S202S11/S202S12  $V_{DRM} : 600V$
5. RMS ON-state current  
 $I_T : \text{MAX. } 8\text{Arms at } T_c \leq 88^\circ\text{C}$   
(With heat sink)
6. Isolation voltage between input and output  
( $V_{iso} : 4\,000V_{rms}$ )
7. Recognized by UL, file No. E94758  
Approved by CSA, No. LR63705

### ■ Applications

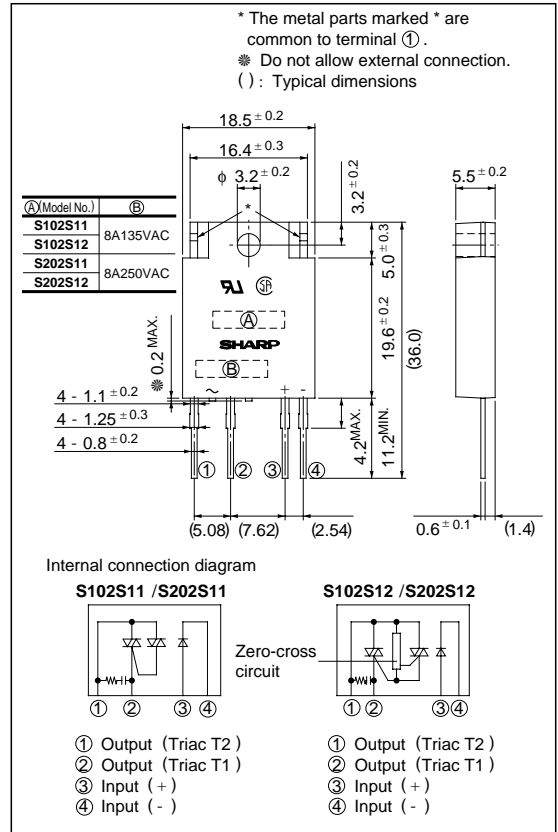
1. Automatic vending machines
2. Amusement equipment
3. Programmable controllers

### ■ Model line-ups

	For 100V lines	For 200V lines
Built-in snubber circuit	<b>S102S11</b>	<b>S202S11</b>
Built-in snubber circuit and zero-cross circuit	<b>S102S12</b>	<b>S202S12</b>

### ■ Outline Dimensions

(Unit : mm)



## Absolute Maximum Ratings

(Ta = 25°C)

Parameter		Symbol	Rating	Unit	
Input	Forward current	I <sub>F</sub>	50	mA	
	Reverse voltage	V <sub>R</sub>	6	V	
Output	RMS ON-state current	I <sub>T</sub>	*48	A <sub>rms</sub>	
	*1 Peak one cycle surge current	I <sub>surge</sub>	80	A	
	Repetitive peak-OFF state voltage	<b>S102S11/S102S12</b>	V <sub>DRM</sub>	400	V
		<b>S202S11/S202S12</b>		600	
	Non-repetitive peak-OFF state voltage	<b>S102S11/S102S12</b>	V <sub>DSM</sub>	400	V
		<b>S202S11/S202S12</b>		600	
Critical rate of rise of ON-state current		dI <sub>T</sub> /dt	50	A/μs	
*2 Isolation voltage		V <sub>iso</sub>	4 000	V <sub>rms</sub>	
Operating temperature		T <sub>opr</sub>	- 20 to + 80	°C	
Storage temperature		T <sub>stg</sub>	- 30 to + 100	°C	
*3 Soldering temperature		T <sub>sol</sub>	260	°C	
Load supply voltage		<b>S102S11/S102S12</b>	135	V <sub>rms</sub>	
		<b>S202S11/S202S12</b>	250		

\*1 50Hz sine wave, start at T<sub>j</sub> = 25°C

\*2 60Hz AC for 1 minute, RH= 40 to 60%, 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<sub>c</sub> ≤ 88°C

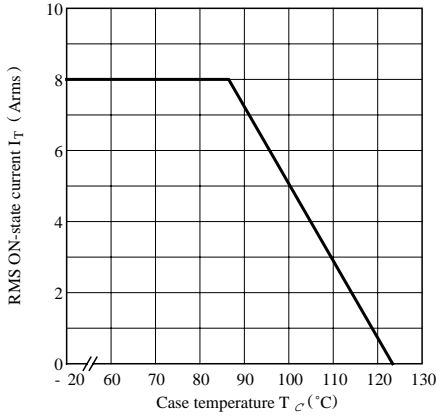
## Electro-optical Characteristics

(Ta = 25°C)

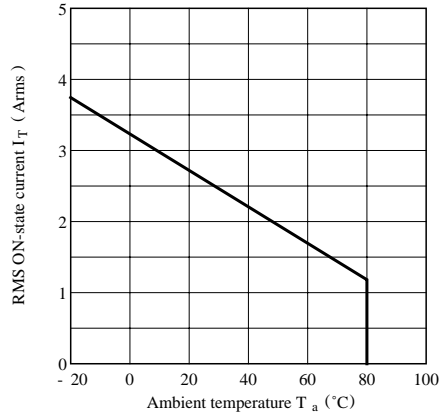
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit	
Input	Forward voltage	V <sub>F</sub>	I <sub>F</sub> = 20mA	-	1.2	1.4	V	
	Reverse current	I <sub>R</sub>	V <sub>R</sub> = 3V	-	-	10 <sup>-4</sup>	A	
Output	ON-state voltage	V <sub>T</sub>	I <sub>T</sub> = 2Arms	-	-	1.5	V <sub>rms</sub>	
	Minimum Operating current	I <sub>op</sub>	V <sub>out</sub> = 120V <sub>rms</sub>	-	-	50	mA <sub>rms</sub>	
			V <sub>out</sub> = 240V <sub>rms</sub>					
	Open circuit leak current	I <sub>leak</sub>	V <sub>out</sub> = 120V <sub>rms</sub>	-	-	5	mA <sub>rms</sub>	
			V <sub>out</sub> = 240V <sub>rms</sub>					
	Critical rate of rise of OFF-state voltage		dV/dt	V <sub>D</sub> = 2/3V <sub>DRM</sub>	30	-	-	V/μs
	Critical rate of rise of Commutating OFF-state voltage		(dV/dt) <sub>C</sub>	T <sub>j</sub> = 125°C dI <sub>T</sub> /dt = -4.0A/ms, *5	5	-	-	V/μs
Zero-cross voltage	<b>S102S12/S202S12</b>	V <sub>OX</sub>	I <sub>F</sub> = 8mA	-	-	35	V	
Transfer characteristics	Minimum trigger current	I <sub>FT</sub>	V <sub>D</sub> = 12V, R <sub>L</sub> = 30Ω	-	-	8	mA	
			V <sub>D</sub> = 6V, R <sub>L</sub> = 30Ω	-	-	8	mA	
	Isolation resistance		R <sub>ISO</sub>	DC500V, RH = 40 to 60%	10 <sup>10</sup>	-	-	Ω
	Turn-on time	t <sub>on</sub>	AC60Hz	-	-	1	ms	
				-	-	9.3	ms	
Turn-off time		t <sub>off</sub>	AC60Hz	-	-	9.3	ms	
Thermal resistance (Between junction and case)		R <sub>th(j-c)</sub>	-	-	4.0	-	°C/W	
Thermal resistance (Between junction and ambience)		R <sub>th(j-a)</sub>	-	-	40	-	°C/W	

\*5 **S102S11/S102S12**: V<sub>D</sub> = 400V **S202S11/S202S12**: V<sub>D</sub> = 600V

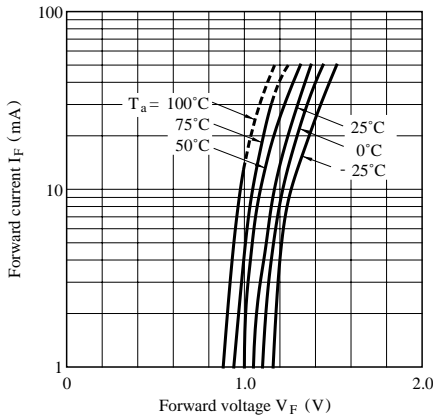
**Fig. 1 RMS ON-state Current vs. Case Temperature**



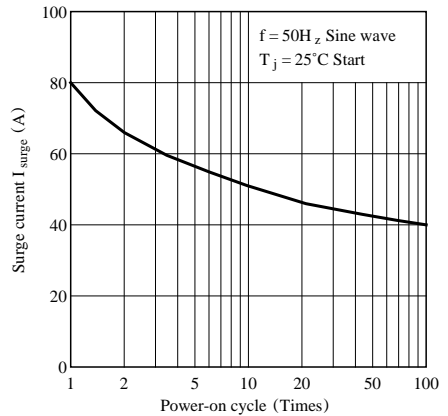
**Fig. 2 RMS ON-state Current vs. Ambient Temperature**



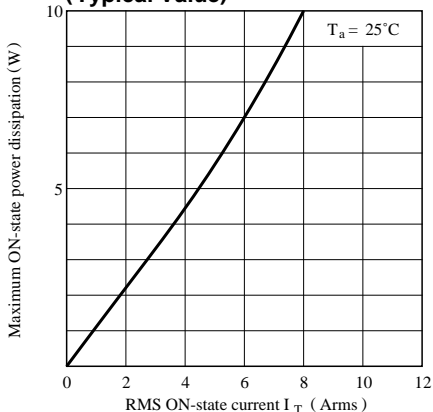
**Fig. 3 Forward Current vs. Forward Voltage (Typical Value)**



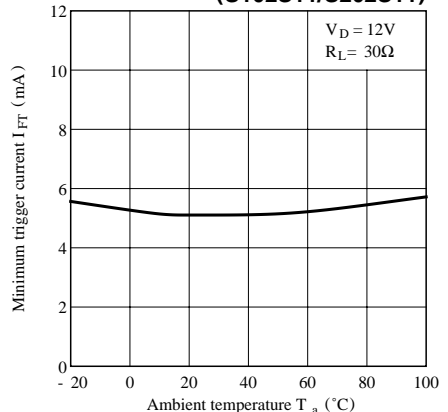
**Fig. 4 Surge Current vs. Power-on Cycle**



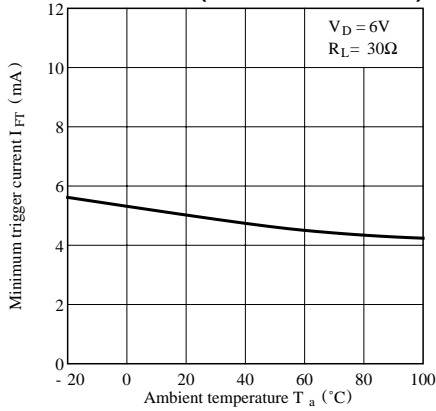
**Fig. 5 Maximum ON-state Power Dissipation vs. RMS ON-state Current (Typical Value)**



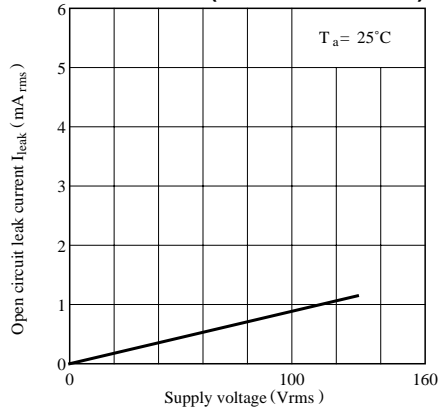
**Fig. 6 Minimum Trigger Current vs. Ambient Temperature (Typical Value) (S102S11/S202S11)**



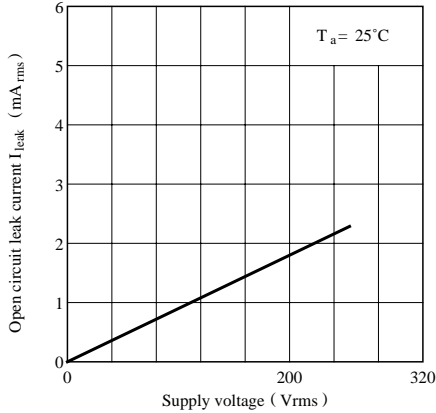
**Fig. 7 Minimum Trigger Current vs. Ambient Temperature (Typical Value) (S102S12/ S202S12)**



**Fig. 8 Open Circuit Leak Current vs. Supply Voltage (Typical Value) (S102S11/S102S12)**



**Fig. 9 Open Circuit Leak Current vs. Supply Voltage (Typical Value) (S202S11/S202S12)**



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

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    - Alarm equipment
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