

# S101D01/S101D02 S201D01/S201D02

## 16-Pin DIP Type SSR for Low Power Control

### ■ Features

1. Compact  
(16-pin dual-in-line package type)
2. RMS ON-state current  $I_T$ : 1.2Arms
3. Built-in zero-cross circuit  
(S101D02, S201D02)
4. Recognised by UL, file No. E94758
5. Approved by CSA, No. LR63705

### ■ Applications

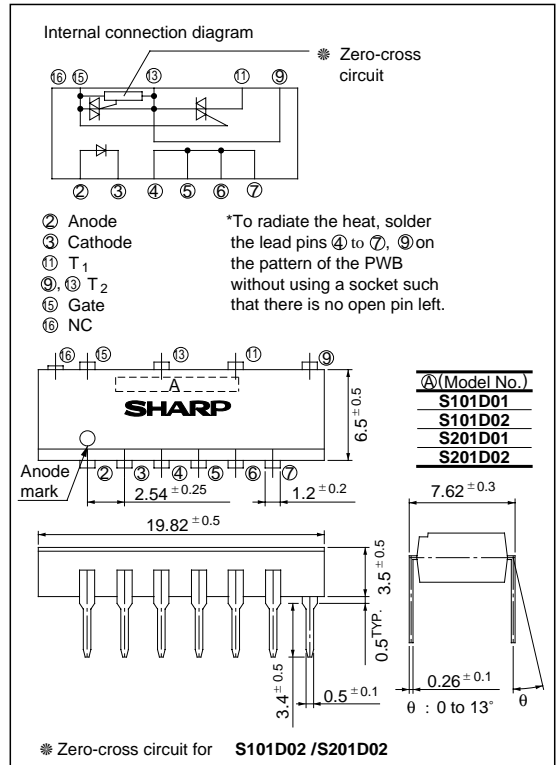
1. Fan heaters
2. Microwave ovens
3. Refrigerators
4. Air conditioners

### ■ Model Line-ups

	For 100V lines	For 200V lines
For phase control No built-in zero-cross circuit	<b>S101D01</b>	<b>S201D01</b>
Built-in zero-cross circuit	<b>S101D02</b>	<b>S201D02</b>

### ■ Outline Dimensions

(Unit : mm)



### ■ Absolute Maximum Ratings

(T<sub>a</sub> = 25°C)

Parameter	Symbol	Rating		Unit
		S101D01/S101D02	S201D01/S201D02	
Input	Forward current	50		mA
	Reverse voltage	6		V
Output	RMS ON-state current	1.2		A <sub>rms</sub>
	*1 Peak one cycle surge current	12		A
	Repetitive peak OFF-state voltage	400	600	V
	*2 Isolation voltage	4 000		V <sub>rms</sub>
Operating temperature	T <sub>opr</sub>	- 25 to + 85		°C
Storage temperature	T <sub>stg</sub>	- 40 to + 125		°C
*3 Soldering temperature	T <sub>sol</sub>	260		°C

\*1 50Hz, sine wave

\*2 40 to 60% RH, AC 60Hz for 1 minute

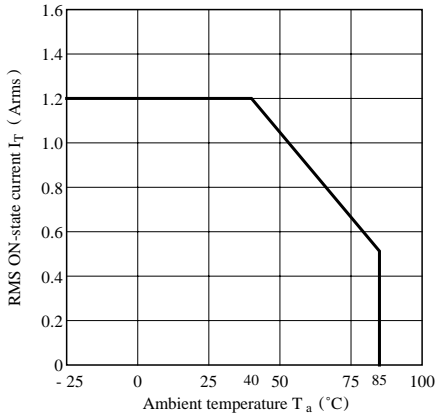
\*3 For 10 seconds

**Electrical Characteristics**

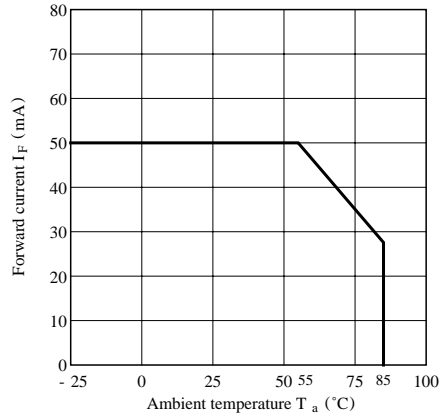
( $T_a = 25^\circ\text{C}$ )

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage	$V_F$	$I_F = 20\text{mA}$	-	1.2	1.4	V
	Reverse current	$I_R$	$V_R = 3\text{V}$	-	-	$10^{-5}$	A
Output	Repetitive peak OFF-state current	$I_{DRM}$	$V_{DRM} = 400\text{V}$	-	-	$10^{-4}$	A
			$V_{DRM} = 600\text{V}$	-	-	$10^{-4}$	A
	ON-state voltage	$V_T$	$I_T = 1.2\text{A}$	-	-	1.7	V
	Holding current	$I_H$	$V_D = 6\text{V}$	-	-	25	mA
	Zero-cross voltage	$V_{OX}$	Resistance load, $I_F = 15\text{mA}$	-	-	35	V
	Critical rate of rise of OFF-state voltage	$dV/dt$	$V_{DRM} = 1/\sqrt{2} \cdot 400\text{V}$	200	-	-	$\text{V}/\mu\text{s}$
$V_{DRM} = 1/\sqrt{2} \cdot 600\text{V}$			100	-	-	$\text{V}/\mu\text{s}$	
Transfer characteristics	Minimum trigger current	$I_{FT}$	$V_D = 6\text{V}, R_L = 100\Omega$	-	-	10	mA
	Isolation resistance	$R_{ISO}$	DC500V, 40 to 60% RH	$5 \times 10^{10}$	$10^{11}$	-	$\Omega$
	Turn-on time	$t_{on}$	$V_D = 6\text{V}, R_L = 100\Omega, I_F = 20\text{mA}$	-	-	100	$\mu\text{s}$

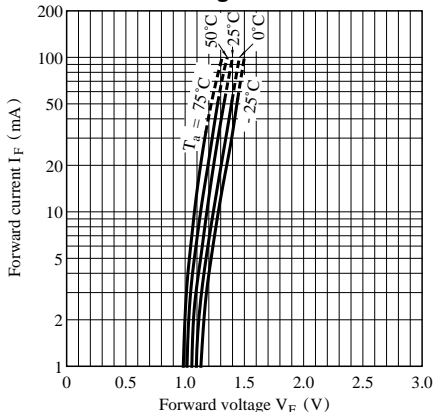
**Fig. 1 RMS ON-state Current vs. Ambient Temperature**



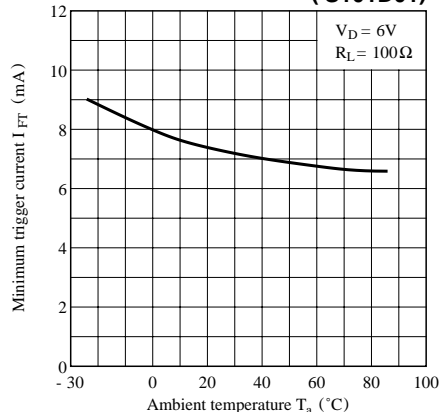
**Fig. 2 Forward Current vs. Ambient Temperature**



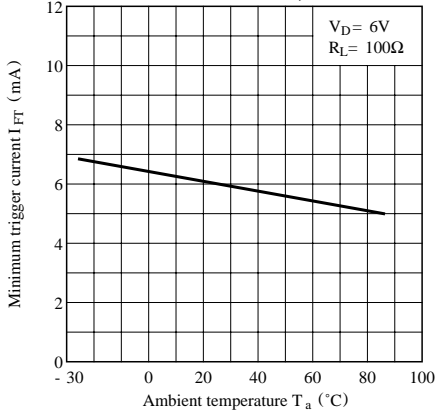
**Fig. 3 Forward Current vs. Forward Voltage**



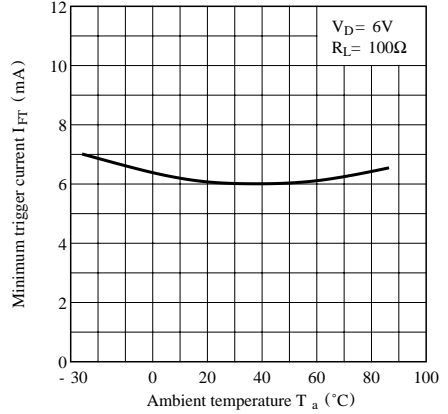
**Fig. 4 Minimum Trigger Current vs. Ambient Temperature (S101D01)**



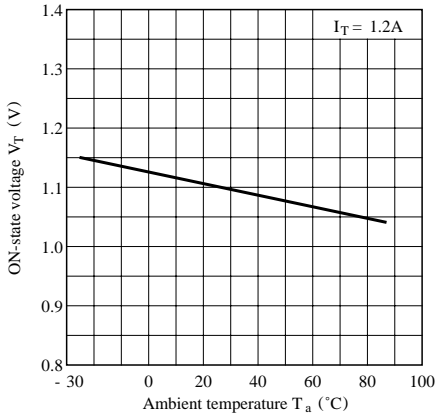
**Fig. 5 Minimum Trigger Current vs. Ambient Temperature (S101D02, S201D02)**



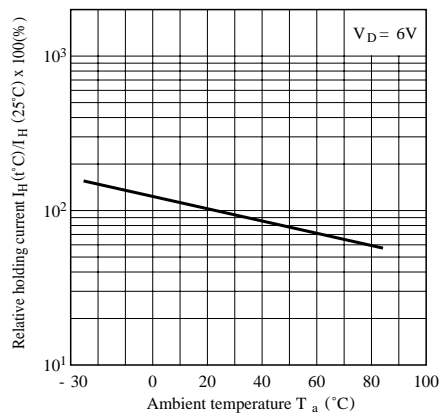
**Fig. 6 Minimum Trigger Current vs. Ambient Temperature (S201D01)**



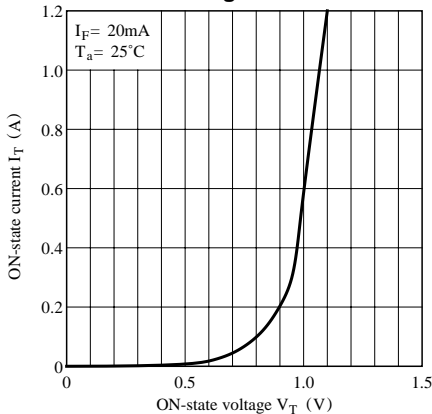
**Fig. 7 ON-state Voltage vs. Ambient Temperature**



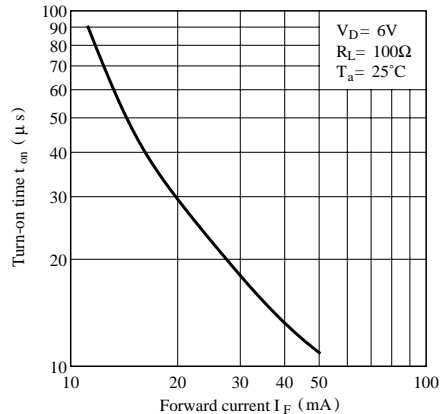
**Fig. 8 Relative Holding Current vs. Ambient Temperature**



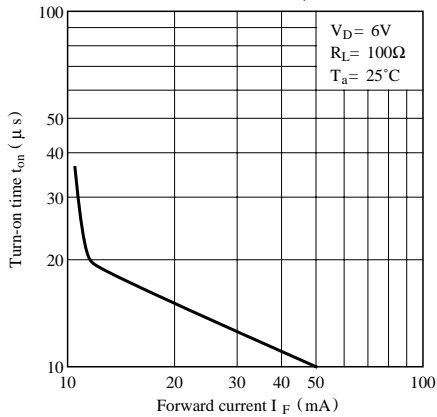
**Fig. 9 ON-state Current vs. ON-state Voltage**



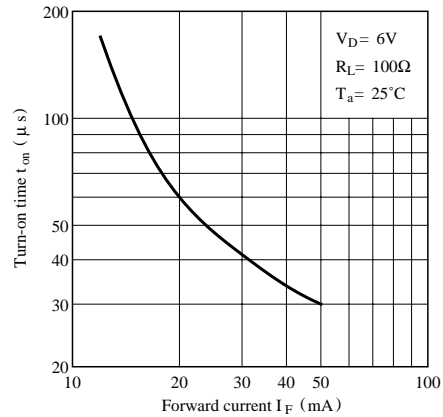
**Fig.10 Turn-on Time vs. Forward Current (S101D01)**



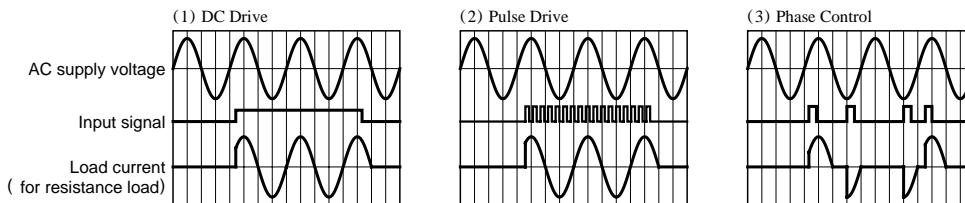
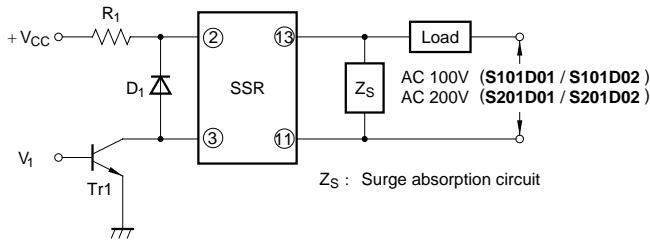
**Fig.11 Turn-on Time vs. Forward Current  
(S101D02, S201D02)**



**Fig.12 Turn-on Time vs. Forward Current  
(S201D01)**



## Basic Operation Circuit



- Notes 1) If large amount of surge is loaded onto  $V_{CC}$  or the driver circuit, add a diode  $D_1$  between terminals 2 and 3 to prevent reverse bias from being applied to the infrared LED.
- 2) Be sure to install a surge absorption circuit.  
An appropriate circuit must be chosen according to the load (for CR, choose its constant). This must be carefully done especially for an inductive load.
- 3) For phase control, adjust such that the load current immediately after the input signal is applied will be more than 60mA.

### (Precautions for Use)

- All pins must be soldered since they are also used as heat sinks (heat radiation fins). In designing, take into the heat radiation from the mounted SSR.
- For higher radiation efficiency that allows wider thermal margin, secure a wider round pattern for Pin 13 when designing mounting pattern. The rounded part of Pin 15 (gate) must be as small as possible. Pulling the gate pattern around increases the change of being affected by external noise.
- As for other general cautions, refer to the chapter "Precautions for Use"

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    - Traffic signals
    - Gas leakage sensor breakers
    - Alarm equipment
    - Various safety devices, etc.
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