

# S11MS3/S11MS4 S21MS3/S21MS4

## High Density Surface Mount Type Mini-flat Package Phototriac Coupler

### Features

1. Ultra-compact, mini-flat package type (3.6 × 4.4X 2.0mm)
2. Opaque type
3. Built-in zero-cross circuit (S11MS4/S21MS4)
4. High isolation voltage between input and output ( $V_{iso} : 3750V_{rms}$ )
5. Recognized by UL, file No. E64380

### Model Line-ups

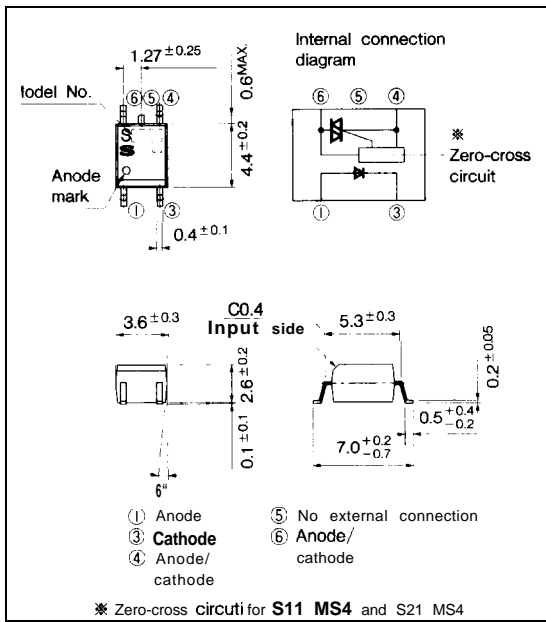
	For 100V lines	For 200V lines
No built-in zero-cross circuit	S11MS3	S21MS3
Built-in zero-cross circuit	S11MS4	S21MS4

### Applications

1. For triggering of medium/high power triacs

### Outline Dimensions

(Unit : mm)



### Absolute Maximum Ratings

( $T_a = 25^\circ C$ )

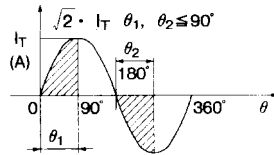
Parameter	Symbol	Rating		Unit
		S11MS3/S11MS4	S21MS3/S21MS4	
Input	Forward current	$I_F$	50	mA
	Reverse voltage	$V_R$	6	V
Output	*1 RMS ON-state current	$I_T$	0.05	$A_{rms}$
	*2 Peak one cycle surge current	$I_{surge}$	0.6	A
	Repetitive peak OFF-state voltage	$V_{DRM}$	400	600
	*isolation voltage	$V_{i..}$	3750	$V_{rms}$
	Operating temperature	$T_{opr}$	-30 to +100	$^\circ C$
	Storage temperature	$T_{stg}$	-40 to +125	$^\circ C$
	*4 Soldering temperature	$T_{sol}$	260	$^\circ C$

\*1 The definition of conduction angle  $\theta$  of effective ON current  $I_T$  should be as shown in the right drawing.

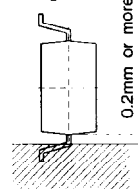
\*2 50Hz sine wave

\*3 40 to 60%RH, AC for 1 minute

\*4 For 10 seconds,



Soldering area



7

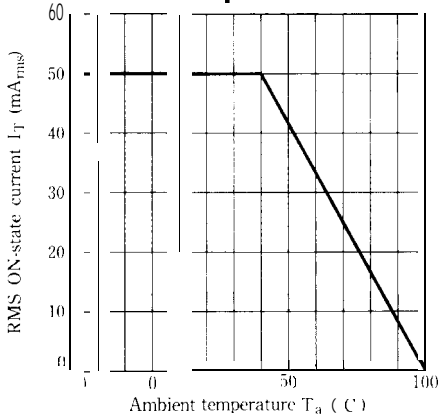
Phototriac Couplers

■ **Electro-optical Characteristics**

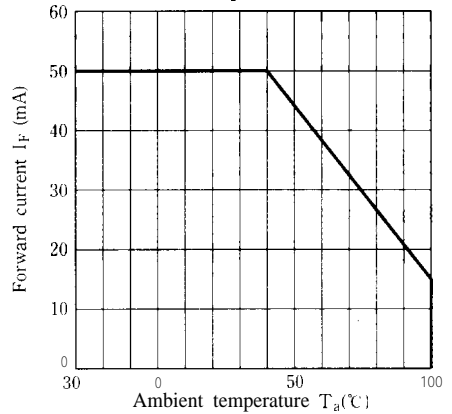
(T<sub>a</sub> = 25°C)

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	μA
	Repetitive peak OFF-state current	I <sub>DRM</sub>	V <sub>DRM</sub> = Rated	—	—	1	μA
ON-state voltage		V <sub>T</sub>	I <sub>T</sub> = 0.05A	—	—	2.5	V
output	Holding current	I <sub>H</sub>	V <sub>D</sub> = 6V	0.1	—	3.5	mA
	Critical rate of rise of OFF-state voltage	dV/dt	V <sub>DRM</sub> = 1/√2 · Rated	100	1 000	—	V/μs
	Zero-cross voltage	S11MS4 S21MS4 V <sub>OX</sub>	I <sub>F</sub> = 15mA, Resistance load	—	—	35	v
Transfer characteristics	Minimum trigger current	I <sub>FT</sub>	V <sub>D</sub> = 6V, R <sub>L</sub> = 100Ω	—	—	10	mA
	Isolation resistance	R <sub>ISO</sub>	DC500V, 40 to 60%RH	5 × 10 <sup>10</sup>	10 <sup>11</sup>	—	Ω
	Turn-on time	S1 1MS3/S21MS3 S11MS4/S21MS4 t <sub>on</sub>	V <sub>D</sub> = 6V, R <sub>L</sub> = 100Ω, I <sub>F</sub> = 20mA	—	—	100 50	μs

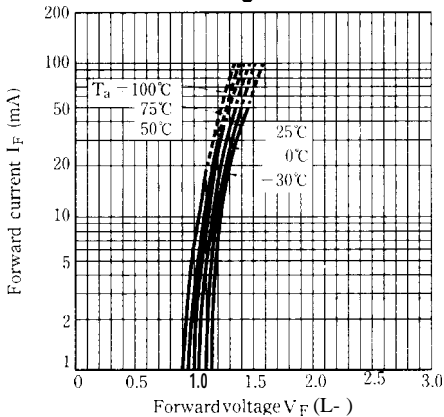
**Fig. 1 RMS ON-state Current vs. Ambient Temperature**



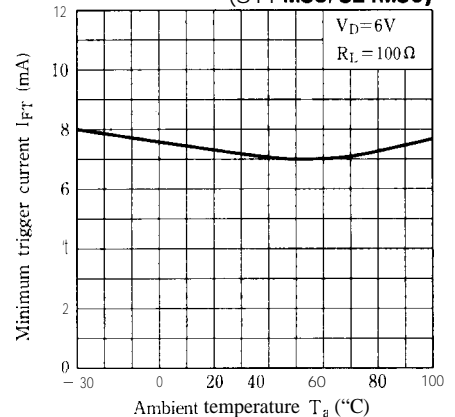
**Fig. 2 Forward Current vs. Ambient Temperature**



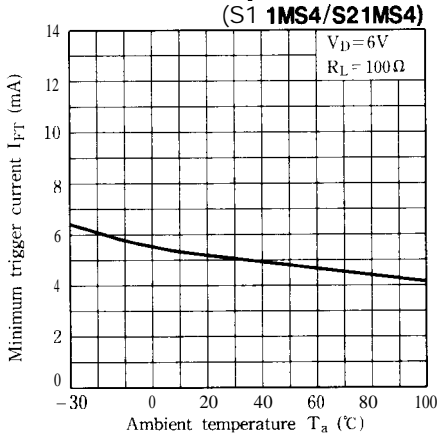
**Fig. 3 Forward Current vs. Forward Voltage**



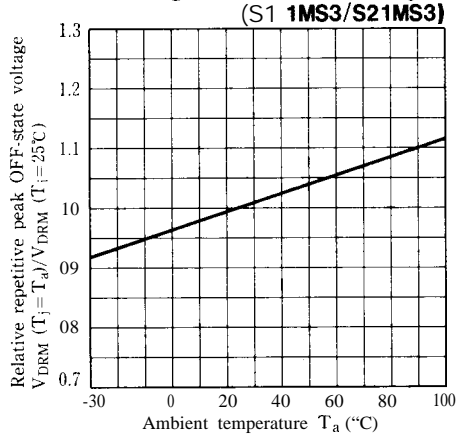
**Fig. 4-a Minimum Trigger Current vs. Ambient Temperature (S11MS3/S21MS3)**



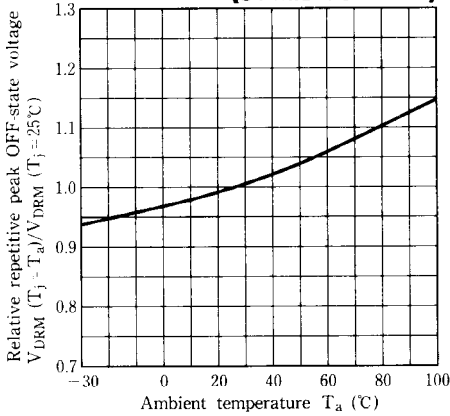
**Fig. 4-b Minimum Trigger Current vs. Ambient Temperature**



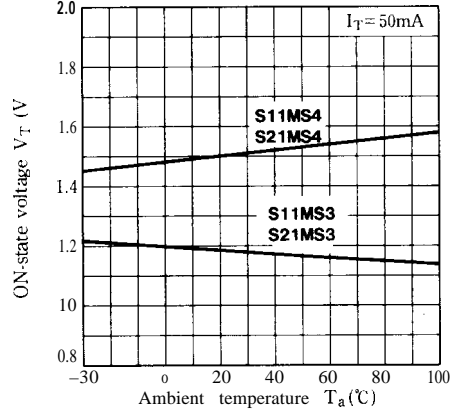
**Fig. 5-a Relative Repetitive Peak OFF-state Voltage vs. Ambient Temperature**



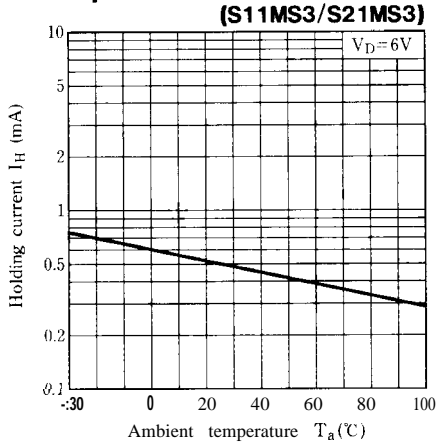
**Fig. 5-b Relative Repetitive Peak OFF-state Voltage vs. Ambient Temperature**



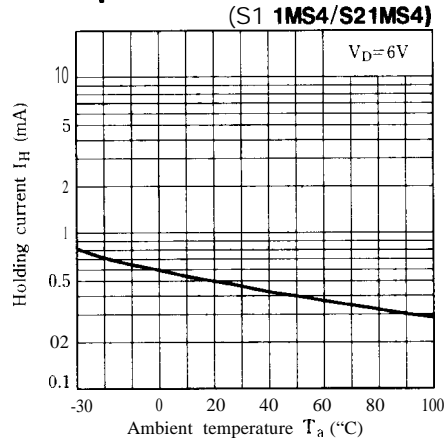
**Fig. 6 ON-state Voltage vs. Ambient Temperature**



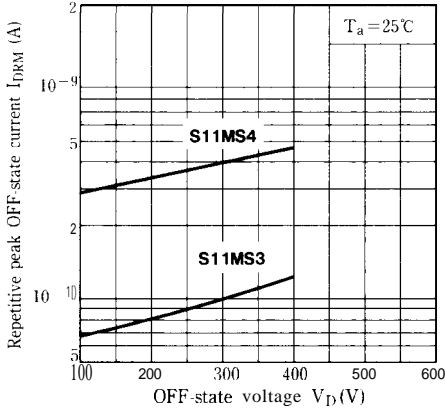
**Fig. 7-a Holding Current vs. Ambient Temperature**



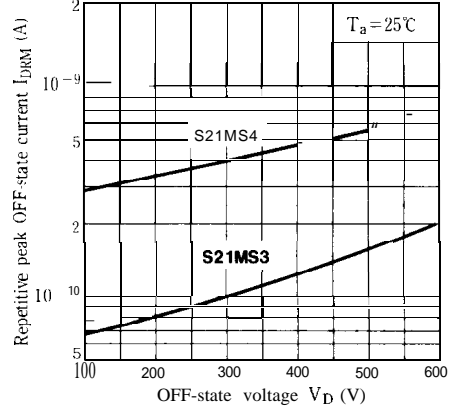
**Fig. 7-b Holding Current vs. Ambient Temperature**



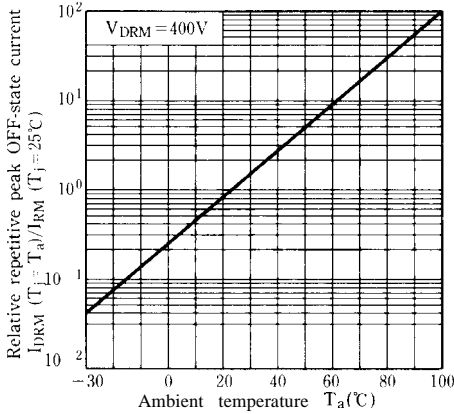
**Fig. 8-a Repetitive Peak OFF-state Current vs. OFF-state Voltage (S11MS3/S11MS4)**



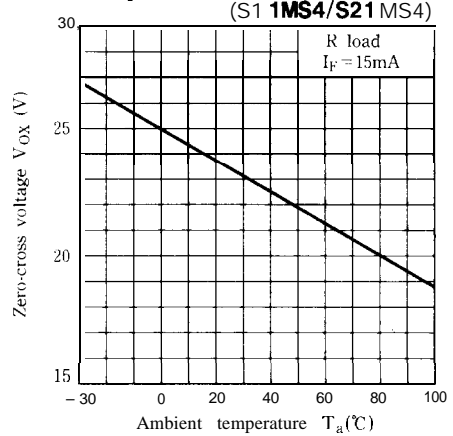
**Fig. 8-b Repetitive Peak OFF-state Current vs. OFF-state Voltage (S21MS3/S21MS4)**



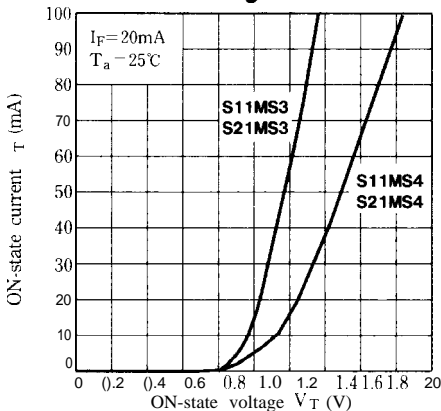
**Fig. 9 Relative Repetitive Peak OFF-state Current vs. Ambient Temperature**



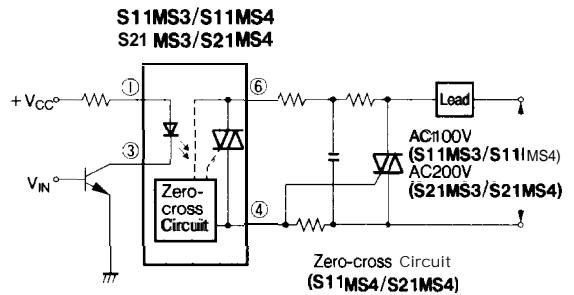
**Fig. 10 Zero-cross Voltage vs. Ambient Temperature (S11MS4/S21MS4)**



**Fig. 11 ON-state Current vs. ON-state Voltage**



**Basic Operation Circuit**



● Please refer to the chapter "Precautions for Use." (Page 78 to 93).