

# S12MD1V/S12MD3

## Photothyristor Coupler

\* Lead forming type (I type) and taping reel type (P type) of **S12MD1V** are also available. (**S12MD1V/S12MDIP**)

### ■ Features

1. High RMS ON-state current ( $I_T$  : MAX. 200mA<sub>rms</sub>)
2. High repetitive peak OFF-state voltage ( $V_{DRM}$  : MIN. 400V)
3. Trigger current  $I_{FT}$  : MAX. 15mA at  $R_G = 20k\Omega$
4. For half-wave control ••• **S12MD1V**  
For full-wave control ••• **S12MD3**
5. Recognized by UL, file No. E64380

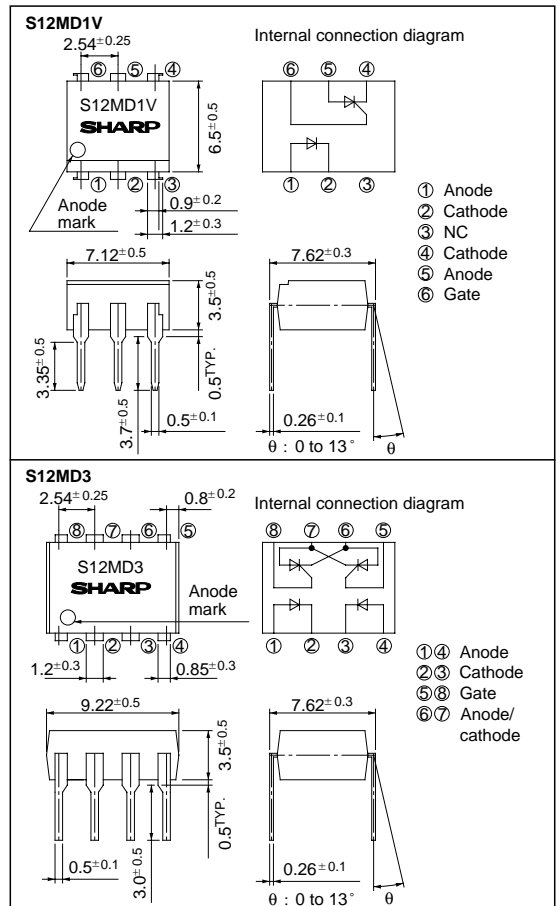
\* **S12MD1V** and **S12MD3** are for 100V line

### ■ Applications

1. ON-OFF operation for a low power load
2. For triggering high power thyristor and triac

### ■ Outline Dimensions

(Unit : mm)



## Absolute Maximum Ratings

(Ta = 25°C)

Parameter	Symbol	Rating		Unit	
		S12MD1V	S12MD3		
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>	200	mA <sub>rms</sub>	
	*1 Peak one cycle surge current	I <sub>surge</sub>	2	A	
	*2 Repetitive peak OFF-state voltage	V <sub>DRM</sub>	400	V	
	*2 Repetitive peak reverse voltage	V <sub>RRM</sub>	400	-	V
	*3 Isolation voltage	V <sub>iso</sub>	5 000	1 500	V <sub>rms</sub>
Operating temperature	T <sub>opr</sub>	- 30 to + 100		°C	
Storage temperature	T <sub>stg</sub>	- 40 to + 125		°C	
*4 Soldering temperature	T <sub>sol</sub>	260		°C	

\*1 50Hz, sine wave      \*3 40 to 60% RH, AC for 1 minute  
 \*2 R<sub>G</sub> = 20kΩ          \*4 For 10 seconds

## Electro-optical Characteristics

(Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage	V <sub>F</sub> I <sub>F</sub> = 30mA	-	1.2	1.4	V
	Reverse current	I <sub>R</sub> V <sub>R</sub> = 3V	-	-	10 <sup>-5</sup>	A
Output	Repetitive peak OFF-state current	I <sub>DRM</sub> V <sub>DRM</sub> = Rated, R <sub>G</sub> = 20kΩ	-	-	10 <sup>-6</sup>	A
	*5 Repetitive peak reverse current	I <sub>RRM</sub> V <sub>RRM</sub> = Rated, R <sub>G</sub> = 20kΩ	-	-	10 <sup>-6</sup>	A
	ON-state voltage	V <sub>T</sub> I <sub>T</sub> = 200mA	-	1.0	1.4	V
	Holding current	I <sub>H</sub> V <sub>D</sub> = 6V, R <sub>G</sub> = 20kΩ	-	0.3	1	mA
	Critical rate of rise of OFF-state voltage	dV/dt V <sub>DRM</sub> = 1/√2 Rated, R <sub>G</sub> = 20kΩ	3	-	-	V/μs
Transfer-characteristics	Minimum trigger current	I <sub>FT</sub> V <sub>D</sub> = 6V, R <sub>L</sub> = 100Ω, R <sub>G</sub> = 20kΩ	-	-	15	mA
	Isolation resistance	R <sub>ISO</sub> DC500V, 40 to 60% RH	5 x 10 <sup>10</sup>	10 <sup>11</sup>	-	Ω
	Turn-on time	t <sub>on</sub> V <sub>D</sub> = 6V, I <sub>F</sub> = 30mA, R <sub>G</sub> = 20kΩ, R <sub>L</sub> = 100Ω	-	10	60	μs

\*5 Applies only to S12MD1V

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

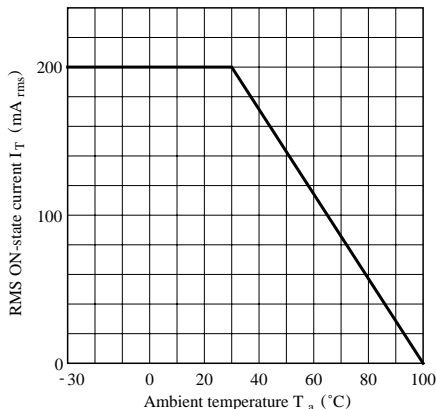


Fig. 2 Forward Current vs. Ambient Temperature

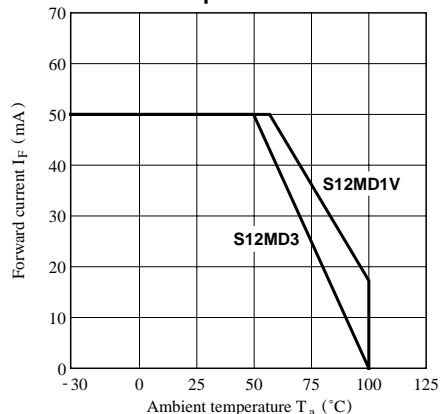


Fig. 3 Forward Current vs. Forward Voltage

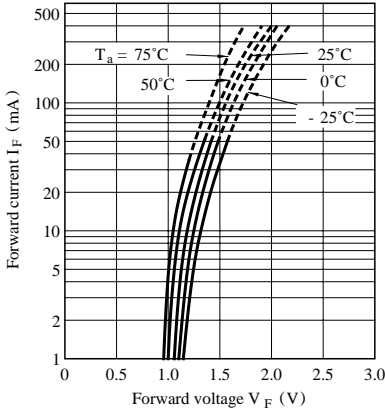


Fig. 4 Minimum Trigger Current vs. Ambient Temperature

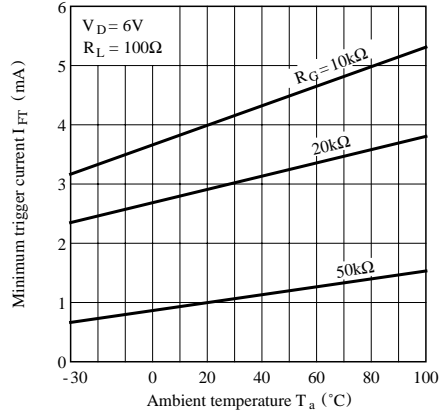


Fig. 5 Minimum Trigger Current vs. Gate Resistance

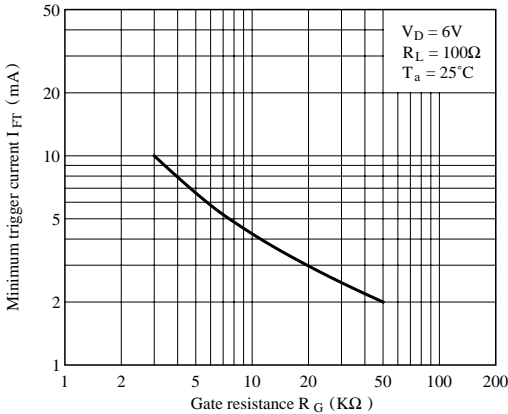


Fig. 6 Break Over Voltage vs. Ambient Temperature

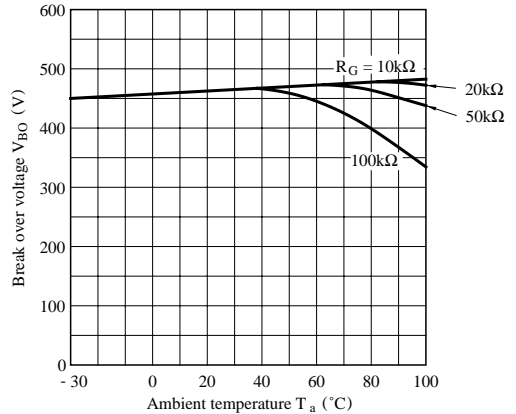


Fig. 7 Critical Rate of Rise of OFF-state Voltage vs. Ambient Temperature

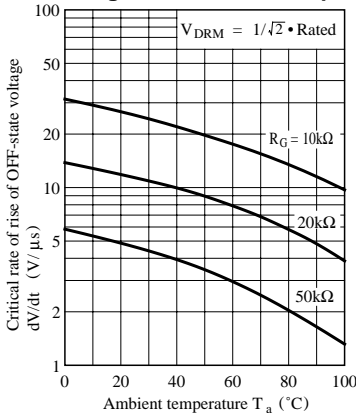
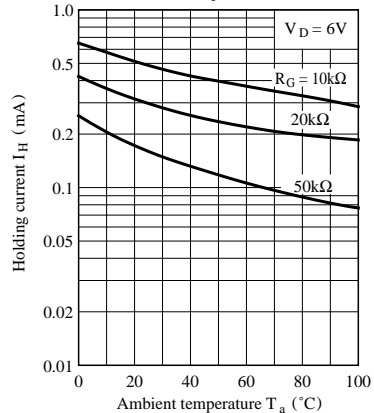
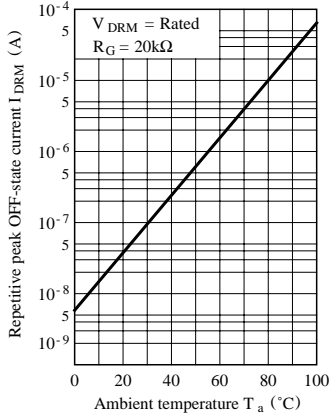


Fig. 8 Holding Current vs. Ambient Temperature



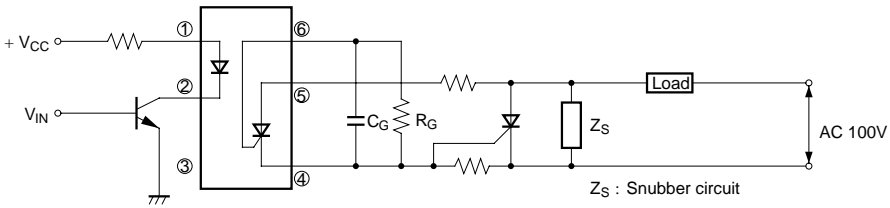
**Fig. 9 Repetitive Peak OFF-state Current vs. Ambient Temperature**



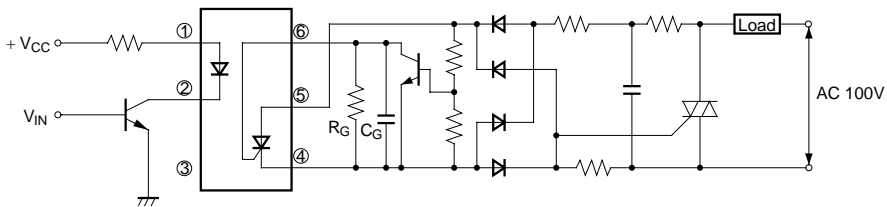
■ **Basic Operation Circuit**

● **S12MD1V**

**Medium/High Power Thyristor Drive Circuit**

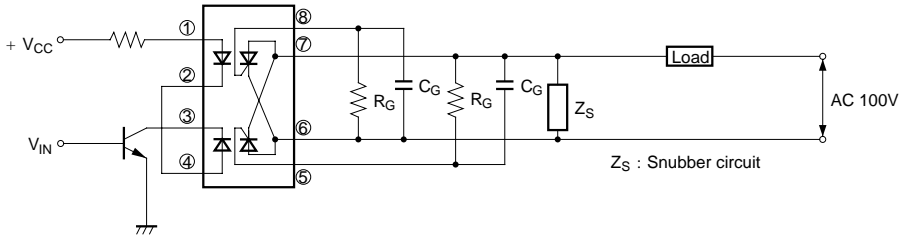


**Medium/High Power Triac Drive Circuit (Zero-cross Operation)**

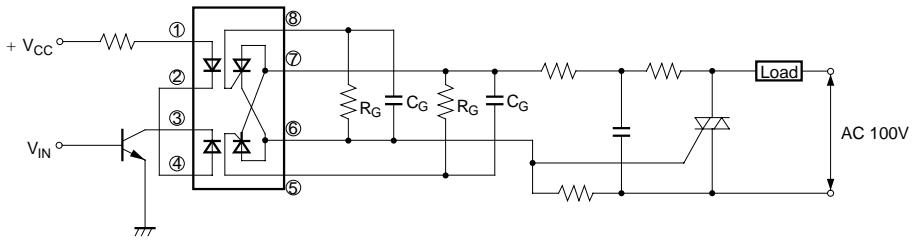


● S12MD3

**Low Power Load Drive Circuit**



**Medium/High Power Triac Drive Circuit**



- Please refer to the chapter “Precautions for Use” (Page 78 to 93).