S12MD1V/S12MD3

Photothyristor Coupler

※ Lead forming type（I type）and taping reel type（P type）of **S12MD1V** are also available.（**S12MD1VI/S12MDIP**）

■ Features

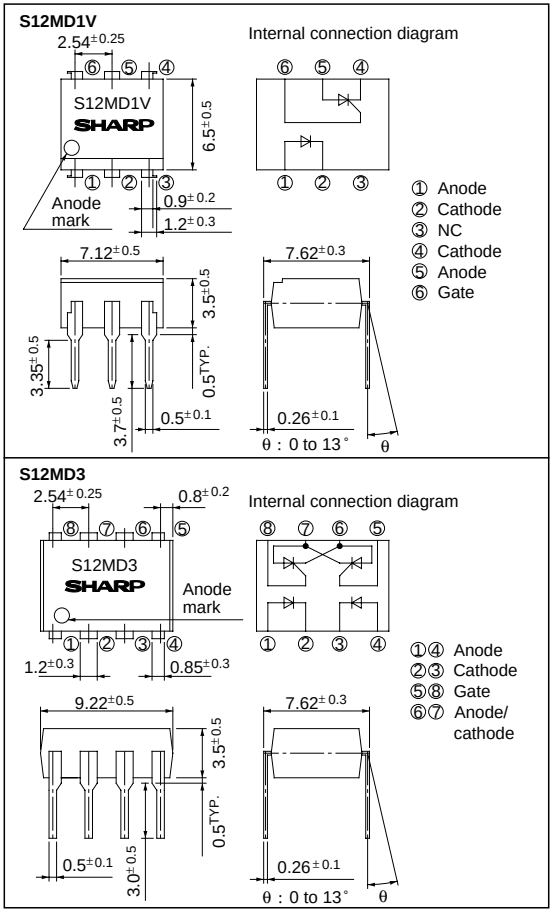
1. High RMS ON-state current（I_T： MAX. 200mA $_{rms}$）
2. High repetitive peak OFF-state voltage （V_{DRM}： MIN. 400V）
3. Trigger current I_{FT}： MAX. 15mA at R_G = 20kΩ
4. For half-wave control ••• **S12MD1V**
   For full-wave control ••• **S12MD3**
5. Recognized by UL, file No. E64380

※ **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_F	50		mA
	Reverse voltage	V_R	6		V
Output	RMS ON-state current	I_T	200		mA_{rms}
	*1 Peak one cycle surge current	I_{surge}	2		A
	*2 Repetitive peak OFF-state voltage	V_{DRM}	400		V
	*2 Repetitive peak reverse voltage	V_{RRM}	400	-	V
*3 Isolation voltage		V_{iso}	5 000	1 500	V_{rms}
Operating temperature		T_{opr}	- 30 to + 100		˚C
Storage temperature		T_{stg}	- 40 to + 125		˚C
*4 Soldering temperature		T_{sol}	260		˚C

∗1 50Hz, sine wave
∗2 R_G = 20kΩ
∗3 40 to 60% RH, AC for 1 minute
∗4 For 10 seconds

■ Electro-optical Characteristics (Ta = 25˚C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage	V_F	I_F = 30mA	-	1.2	1.4	V
	Reverse current	I_R	V_R = 3V	-	-	10^{-5}	A
Output	Repetitive peak OFF-state current	I_{DRM}	V_{DRM} = Rated, R_G = 20kΩ	-	-	10^{-6}	A
	*5 Repetitive peak reverse current	I_{RRM}	V_{RRM} = Rated, R_G = 20kΩ	-	-	10^{-6}	A
	ON-state voltage	V_T	I_T = 200mA	-	1.0	1.4	V
	Holding current	I_H	V_D = 6V, R_G = 20kΩ	-	0.3	1	mA
	Critical rate of rise of OFF-state voltage	dV/dt	$V_{DRM} = 1/\sqrt{2}$ Rated, R_G = 20kΩ	3	-	-	V/μs
Transfer-characteristics	Minimum trigger current	I_{FT}	V_D = 6V, R_L = 100Ω, R_G = 20kΩ	-	-	15	mA
	Isolation resistance	R_{ISO}	DC500V, 40 to 60% RH	5 x 10^{10}	10^{11}	-	Ω
	Turn-on time	t_{on}	V_D = 6V, I_F = 30mA, R_G = 20kΩ, R_L = 100Ω	-	10	60	μs

∗5 Applies only to **S12MD1V**

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

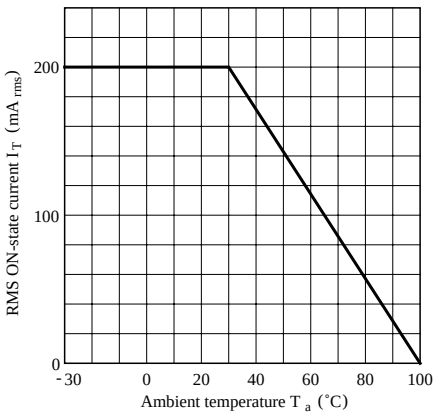


Fig. 2 Forward Current vs. Ambient Temperature

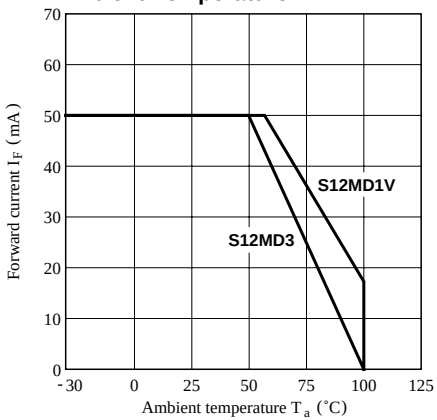


Fig. 3 Forward Current vs. Forward Voltage

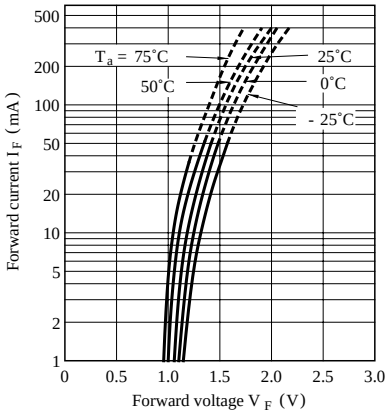


Fig. 4 Minimum Trigger Current vs. Ambient Temperature

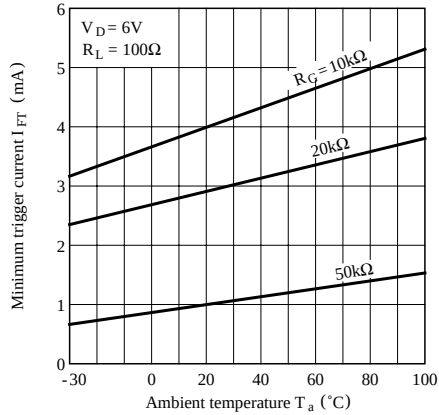


Fig. 5 Minimum Trigger Current vs. Gate Resistance

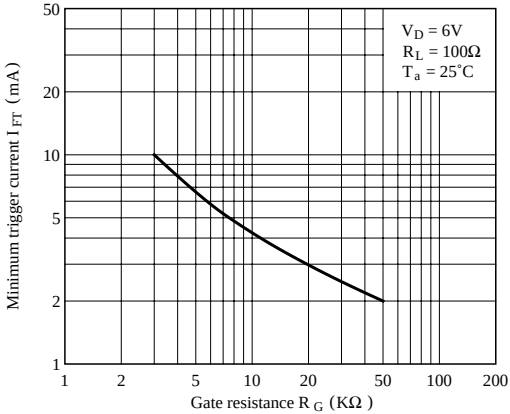


Fig. 6 Break Over Voltage vs. Ambient Temperature

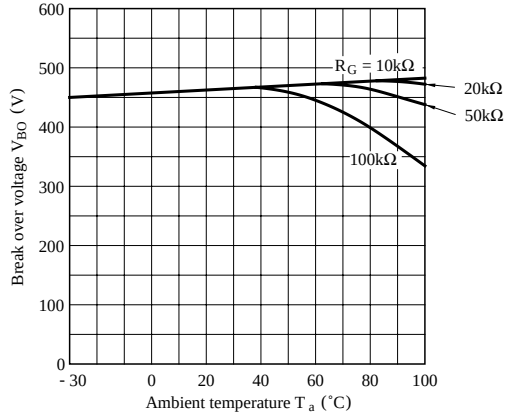


Fig. 7 Critical Rate of Rise of OFF-state Voltage vs. Ambient Temperature

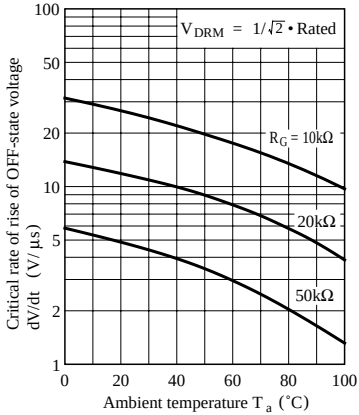


Fig. 8 Holding Current vs. Ambient Temperature

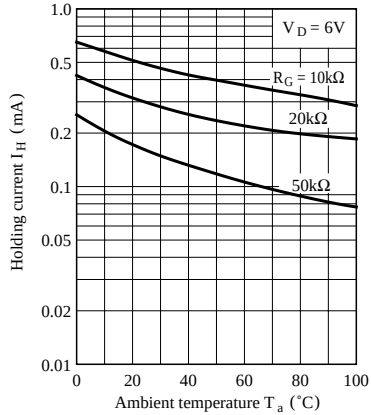
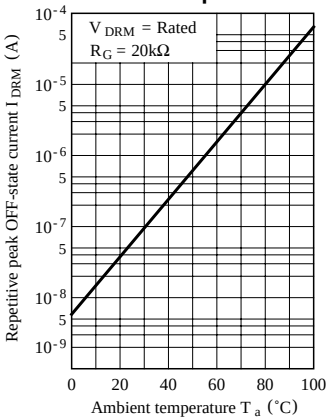


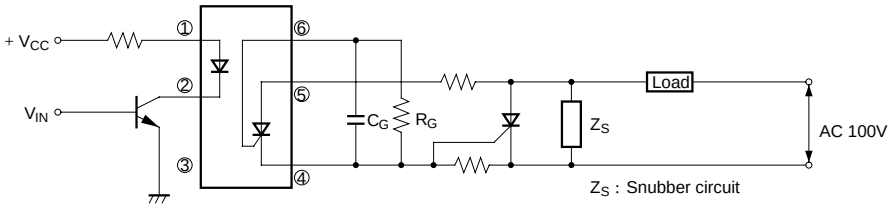
Fig. 9 Repetitive Peak OFF-state Current vs. Ambient Temperature



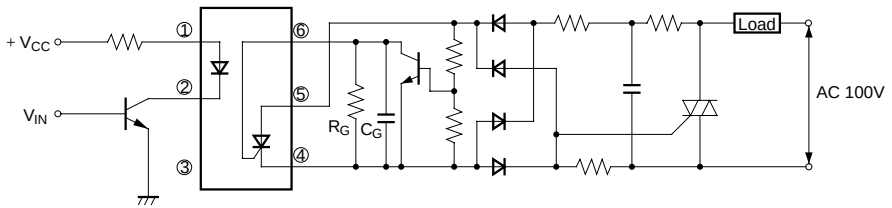
■ Basic Operation Circuit

● **S12MD1V**

Medium/High Power Thyristor Drive Circuit

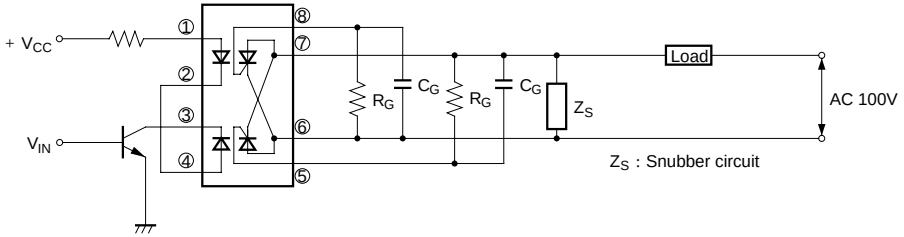


Medium/High Power Triac Drive Circuit (Zero-cross Operation)

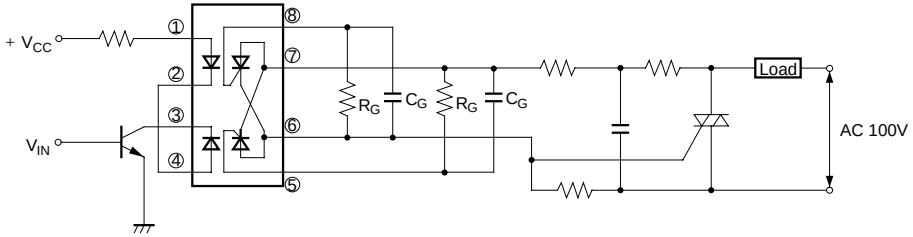


● **S12MD3**

Low Power Load Drive Circuit



Medium/High Power Triac Drive Circuit



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

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