

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_{rms})
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

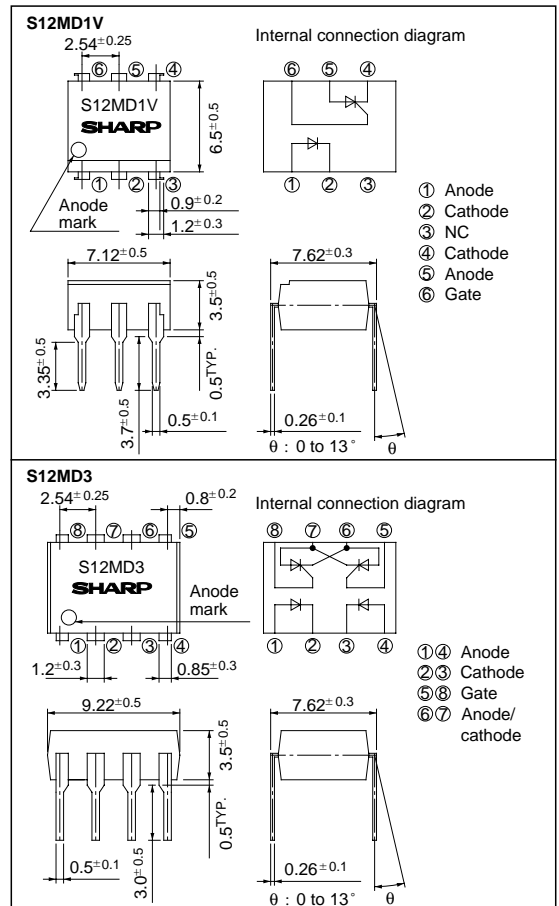
※ **S12MD1V** and **S12MD3** are for 100V line

■ 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 _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 *3 40 to 60% RH, AC for 1 minute

*2 R_G = 20kΩ

*4 For 10 seconds

Electro-optical Characteristics

(Ta = 25°C)

| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|--------------------------|--|--|----------------------|------------------|------------------|------|
| Input | Forward voltage | V _F = 30mA | - | 1.2 | 1.4 | V |
| | Reverse current | I _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/√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

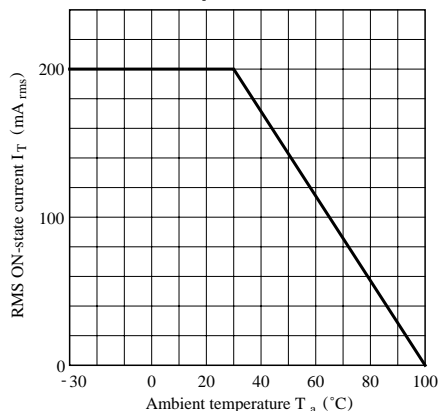


Fig. 2 Forward Current vs. Ambient Temperature

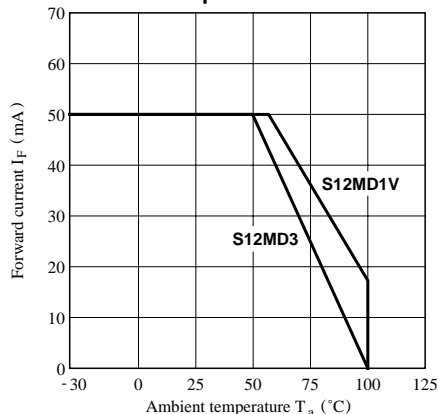


Fig. 3 Forward Current vs. Forward Voltage

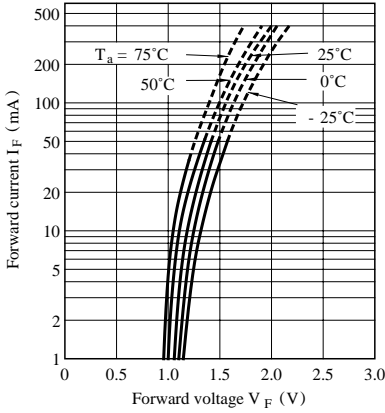


Fig. 4 Minimum Trigger Current vs. Ambient Temperature

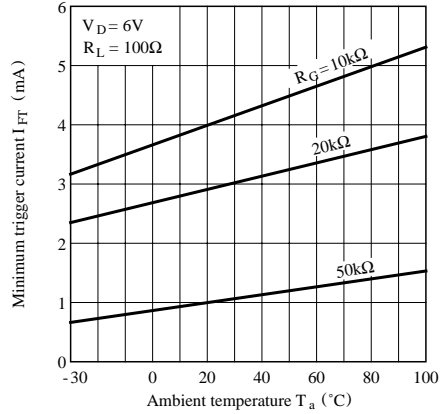


Fig. 5 Minimum Trigger Current vs. Gate Resistance

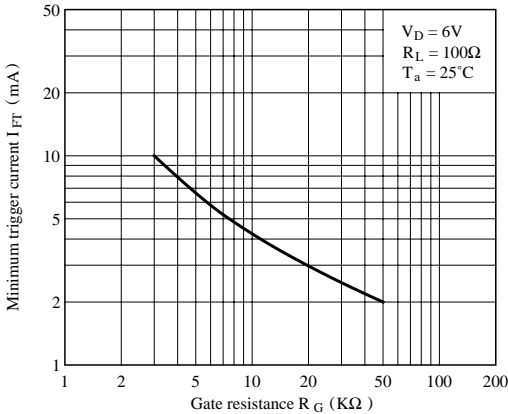


Fig. 6 Break Over Voltage vs. Ambient Temperature

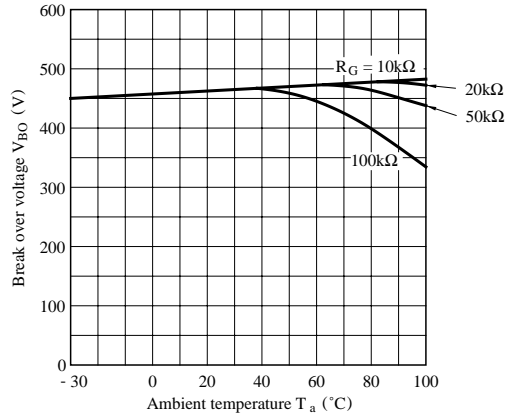


Fig. 7 Critical Rate of Rise of OFF-state Voltage vs. Ambient Temperature

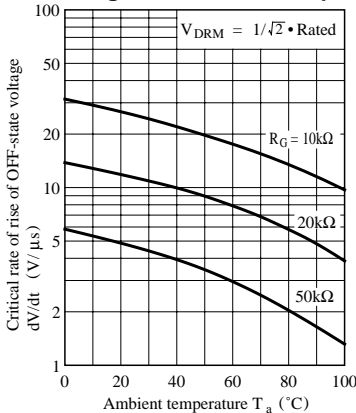


Fig. 8 Holding Current vs. Ambient Temperature

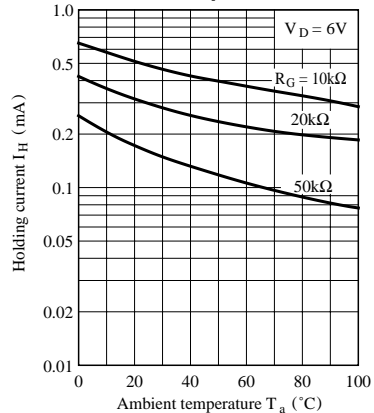
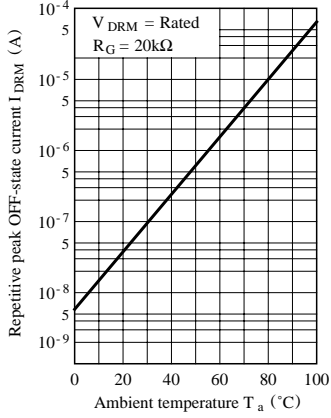


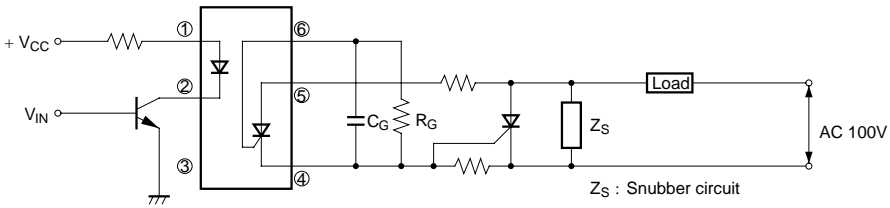
Fig. 9 Repetitive Peak OFF-state Current vs. Ambient Temperature



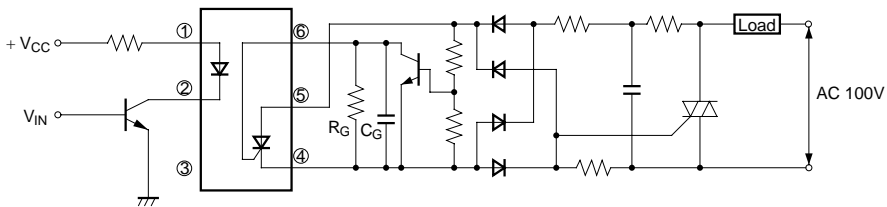
■ **Basic Operation Circuit**

● **S12MD1V**

Medium/High Power Thyristor Drive Circuit

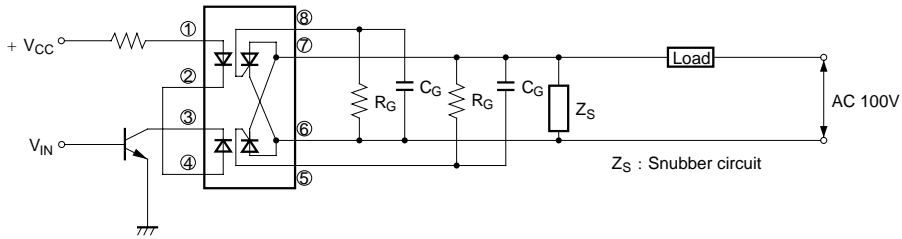


Medium/High Power Triac Drive Circuit (Zero-cross Operation)

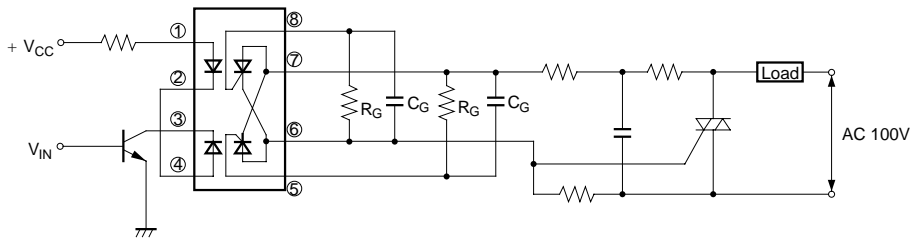


● S12MD3

Low Power Load Drive Circuit



Medium/High Power Triac Drive Circuit



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