S11MD7T/S11MD8T/S11MD9T S21MD7T/S21MD8T/S21MD9T

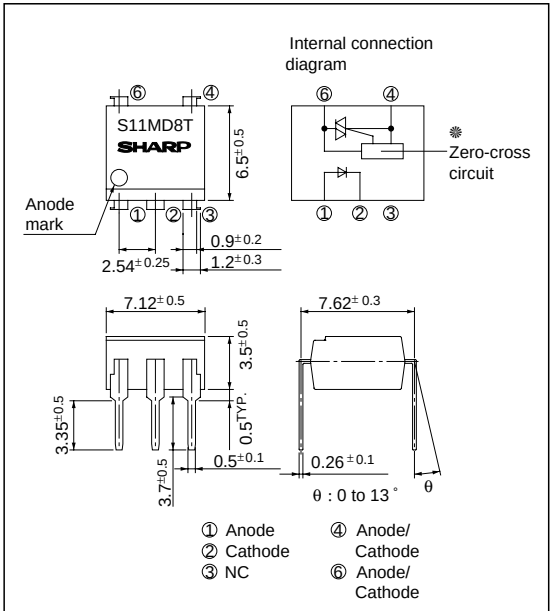
Low Input Driving Type Phototriac Coupler

✵ Taping reel type of **S21MD8T** is also available (**S21MD8P**)
✵ DIN-VDE0884 approved type is also available.

■ Features

1. Low input driving current
   (**S11MD7T**/ **S11MD8T**/ **S21MD7T**/ **S21MD8T**
   I_{FT} : MAX. 5mA
   S11MD9T /S21MD9T I_{FT} : MAX.7mA)
2. Pin No. 5 completely molded for external noise resistance
3. Built-in zero-cross circuit (**S11MD8T/S21MD8T**)
4. High repetitive peak OFF-state voltage
   (**S11MD7T** / **S11MD8T** / **S11MD9T**
   V_{DRM} : MIN. 400V
   S21MD7T / **S21MD8T** / **S21MD9T**
   V_{DRM} : MIN. 600V
5. Isolation voltage between input and output
   (V_{iso} : 5 000V_{rms})
6. Recognized by UL, file No.E64380

■ Outline Dimensions (Unit : mm)



∗ Zero-cross circuit for **S11MD8T** and **S21MD8T**

■ Model Line-ups

	100V line	200V line
No zero-cross circuit	**S11MD7T/ S11MD9T**	**S21MD7T/ S21MD9T**
Built-in zero-cross circuit	**S11MD8T**	**S21MD8T**

■ Applications

1. For triggering medium/high power triacs

■ Absolute Maximum Ratings (Ta = 25˚C)

Parameter		Symbol	Rating		Unit
			S11MD7T/S11MD8T S11MD9T	**S21MD7T/S21MD8T/ S21MD9T**	
Input	Forward current	I_F	50		mA
	Reverse voltage	V_R	6		V
Output	RMS ON-state current	I_T	0.1		A_{rms}
	*1Peak one cycle surge current	I_{surge}	1.2		A
	Repetitive peak OFF-state voltage	V_{DRM}	400	600	V
*2Isolation voltage		V_{iso}	5 000		V_{rms}
Operating temperature		T_{opr}	- 30 to +100		˚C
Storage temperture		T_{stg}	- 55 to +125		˚C
*3Soldering temperature		T_{sol}	260		˚C

∗1 50Hz Sine wave
∗2 40 to 60% RH, AC for 1 minute, f = 60Hz
∗3 For 10 seconds

" In the absence of confirmation by device specification sheets, SHARP takes no responsibility for any defects that occur in equipment using any of SHARP's devices, shown in catalogs, data books, etc. Contact SHARP in order to obtain the latest version of the device specification sheets before using any SHARP's device."

■ Electro-optical Characteristics

(Ta = 25˚C)

Parameter			Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage		V_F	I_F = 20mA	-	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	-	-	10^{-6}	A
	ON-state voltage	S11MD7T/S21MD7T S11MD9T/S21MD9T	V_T	I_T = 0.1A	-	1.5	2.5	V
		S11MD8T/S21MD8T			-	1.7	2.5	
	Holding current		I_H	V_D = 6V	0.1	0.5	3.5	mA
	Critical rate of rise of OFF-state voltage		dV/dt	V_{DRM} = $1/\sqrt{2}$ • Rated	100	-	-	V/μs
	Zere-cross voltage	S11MD8T/S21MD8T	V_{OX}	Resistance load, I_F = 10mA	-	-	35	V
Transfer characteristics	Minimum trigger current	S11MD7T/S21MD7T S11MD8T/S21MD8T	I_{FT}	V_D = 6V, R_L = 100Ω	-	-	5	mA
		S11MD9T/S21MD9T			-	-	7	
	Isolation resistance		R_{ISO}	DC500V, 40 to 60% RH	5 x 10^{10}	10^{11}	-	Ω
	Turn-on time	S11MD7T	t_{on}	V_D = 6V, R_L = 100Ω I_F = 20mA	-	70	100	μs
		S11MD9T/S21MD7T/ S21MD9T			-	60	100	
		S11MD8T/S21MD8T			-	20	50	

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

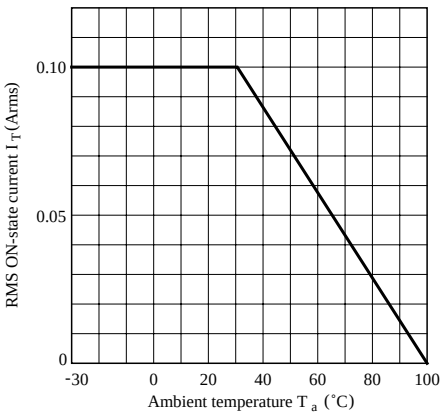


Fig. 2 Forward Current vs. Ambient Temperature

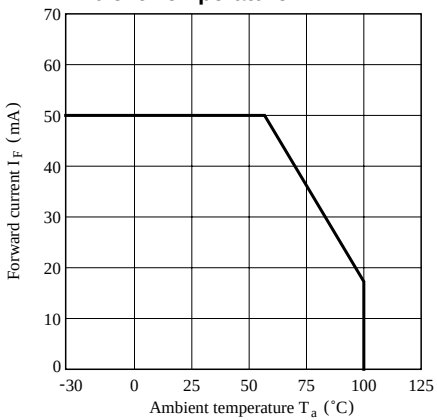


Fig. 3 Forward Current vs. Forward Voltage

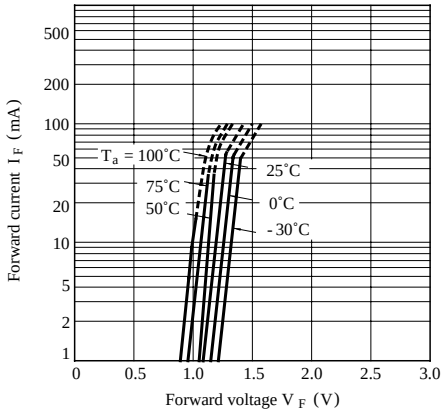


Fig. 4 Minimum Trigger Current vs. Ambient Temperature

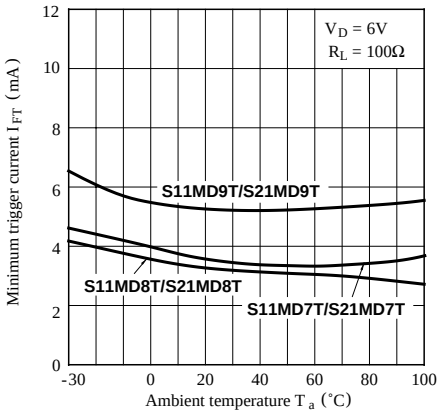


Fig. 5 Relative Repetitive Peak OFF-State Voltage vs. Ambient Temperature

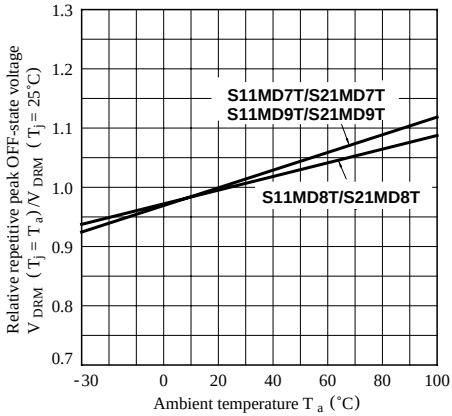


Fig. 6 ON-state Voltage vs. Ambient Temperature

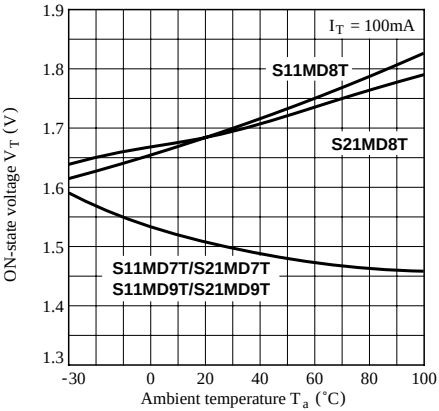


Fig. 7 Holding Current vs. Ambient Temperature

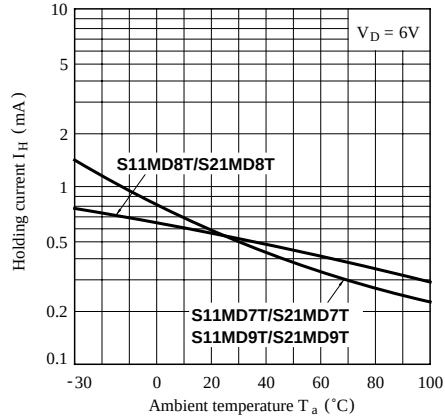


Fig. 8-a Repetitive Peak OFF-state Current vs. OFF-state Voltage (S11MD7T/S11MD9T)

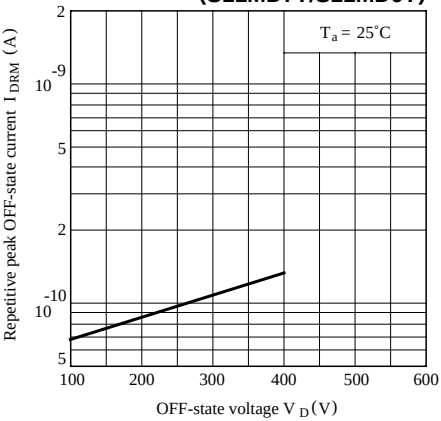


Fig. 8-b Repetitive Peak OFF-state Current vs. OFF-state Voltage (S11MD8T/S21MD8T)

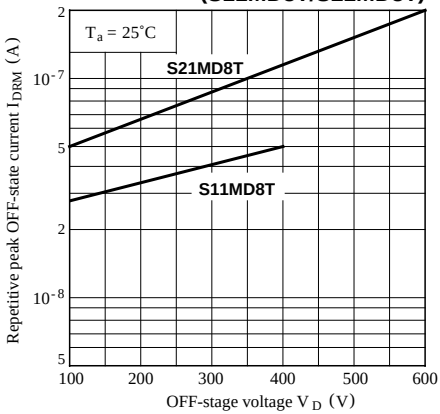


Fig. 8-c Repetitive Peak OFF-state Current vs. OFF-state Voltage (S21MD7T/S21MD9T)

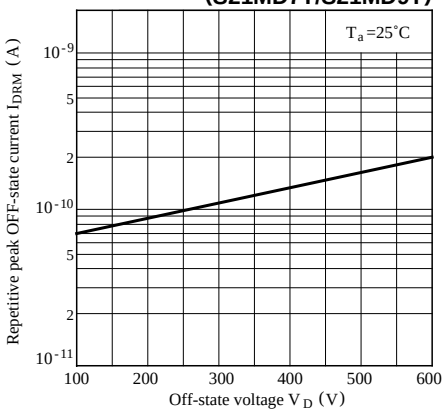


Fig. 9-a Repetitive Peak OFF-state Current vs. Ambient Temperature (S11MD7T/S11MD9T/S21MD7T/S21MD9T)

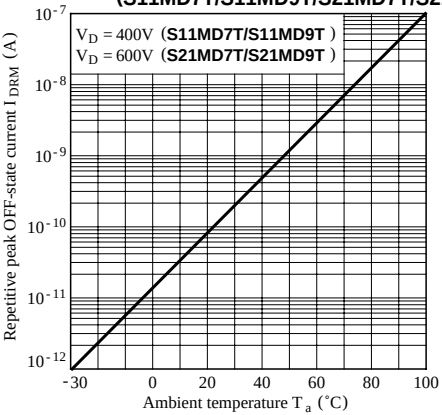


Fig. 9-b Repetitive Peak OFF-state Current vs. Ambient Temperature (S11MD8T/S21MD8T)

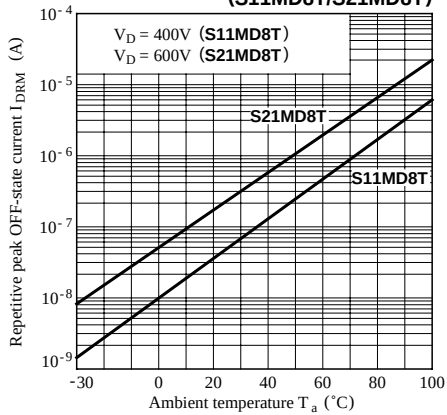


Fig.10 Zero-cross Voltage vs. Ambient Temperature (S11MD8T/S21MD8T)

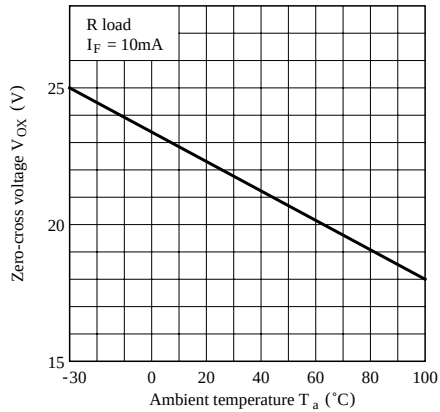


Fig.11-a Turn-on Time vs. Forward Current (S11MD7T)

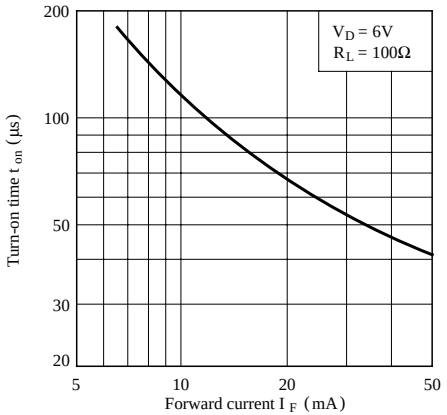


Fig.11-b Turn-on Time vs. Forward Current (S11MD8T/S21MD8T)

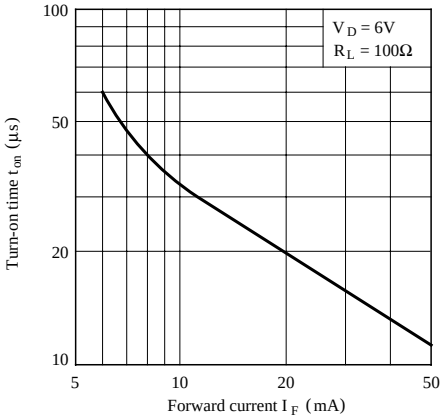


Fig.11-c Turn-on Time vs. Forward Current (S11MD9T/S21MD7T/S21MD9T)

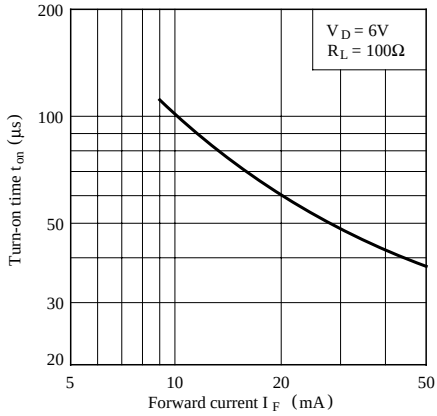


Fig.12-a ON-state Current vs. ON-state Voltage (S11MD7T/S21MD7T/S11MD9T/S21MD9T)

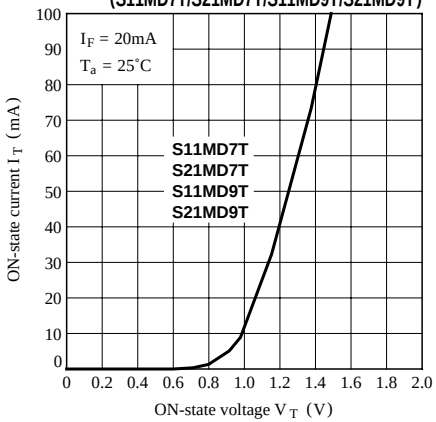
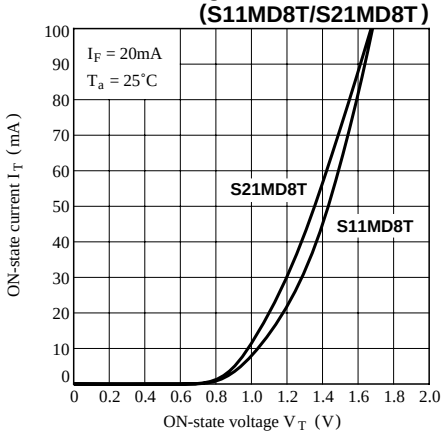
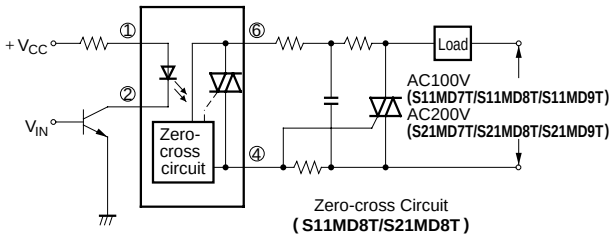


Fig.12-b ON-state Current vs. ON-state Voltage (S11MD8T/S21MD8T)



■ Basic Operation Circuit

S11MD7T/S11MD8T/S11MD9T
S21MD7T/S21MD8T/S21MD9T



Zero-cross Circuit
(S11MD8T/S21MD8T)

- Please refer to the chapter " Precautions for Use."