S11MD5T/S21MD3TV/ S21MD4TV

High Noise-resistance Type Phototriac Coupler

■ Features

1. NO.5 pin completely sealed in the mold for external noise resistance
2. Built-in zero-cross circuit **(S21MD4TV)**
3. High repetitive peak OFF-state voltage.
   - **S11MD5T** V_{DRM} : MIN. 400V
   - **S21MD3TV/S21MD4TV** V_{DRM} : MIN. 600V
4. Isolation voltage between input and output
   (Viso : 5 000 Vrms)
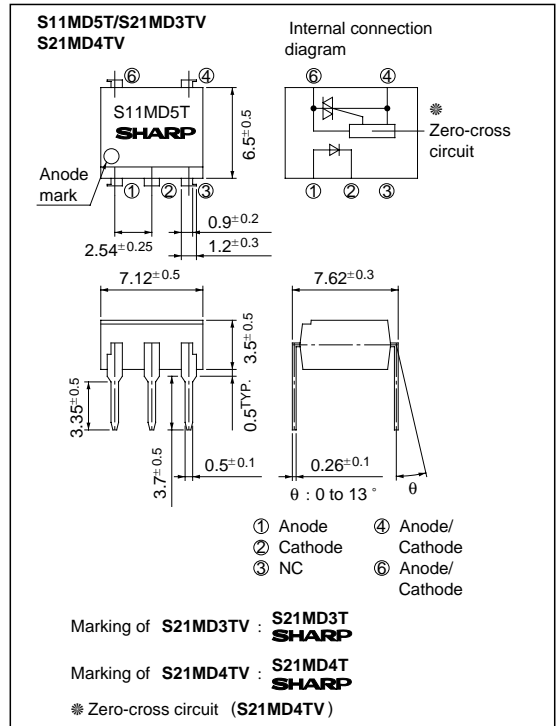5. Recognized by UL : recognized, file No. E64380

■ Applications

1. For triggering of power triac

■ Model Line-ups

100V	**S11MD5T**
200V	**S21MD3TV/S21MD4TV**

■ Outline Dimensions   （Unit : mm）

S11MD5T/S21MD3TV
S21MD4TV

Internal connection diagram

Zero-cross circuit

S11MD5T
SHARP

Anode mark

$6.5^{\pm 0.5}$
$0.9^{\pm 0.2}$
$2.54^{\pm 0.25}$ $1.2^{\pm 0.3}$
$7.12^{\pm 0.5}$ $7.62^{\pm 0.3}$
$3.5^{\pm 0.5}$
$3.35^{\pm 0.5}$ 0.5TYP.
$3.7^{\pm 0.5}$ $0.5^{\pm 0.1}$ $0.26^{\pm 0.1}$
θ : 0 to 13 °

① Anode
② Cathode
③ NC
④ Anode/Cathode
⑥ Anode/Cathode

Marking of **S21MD3TV** : **S21MD3T**
SHARP

Marking of **S21MD4TV** : **S21MD4T**
SHARP

❋ Zero-cross circuit （**S21MD4TV**）

■ Absolute Maximum Ratings   (Ta = 25℃)

Parameter		Symbol	Rating		Unit
			S11MD5T	**S21MD3TV/S21MD4TV**	
Input	Forward current	I_F	50		mA
	Reverse voltage	V_R	6		V
Output	RMS ON-state current	I_T	0.1		A_{rms}
	*1 Peak one cycle surge current	I_{surge}	1.2		A
	Repetitive peak OFF-state voltage	V_{DRM}	400	600	V
	*2 Isolation voltage	V_{iso}	5 000		V_{rms}
	Operating temperature	T_{opr}	- 30 to +100		℃
	Storage temperature	T_{stg}	- 55 to +125		℃
	*3 Soldering temperature	T_{sol}	260		℃

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

■ Electro-optical Characteristics

(Ta= 25°C)

Parameter			Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage	**S11MD5T/S21MD4TV**	V_F	$I_F = 20mA$	-	1.2	1.4	V
		S21MD3TV		$I_F = 30mA$				
	Reverse current		I_R	$V_R = 3V$	-	-	10^{-5}	A
Output	Repetitive peak OFF-state current		I_{DRM}	$V_{DRM} = R_{ated}$	-	-	10^{-6}	A
	ON-state voltage	**S11MD5T**	V_T	$I_T = 0.1A$	-	1.3	2.0	V
		S21MD3TV/S21MD4TV			-	1.7	2.5	V
	Holding current		I_H	$V_D = 6V$	0.1	1	3.5	mA
	Critical rate of rise of OFF-state voltage	**S11MD5T/S21MD4TV**	dV/dt	$V_{DRM} = 1/\sqrt{2}$ Rated	100	-	-	V/μs
		S21MD3TV			500	-	-	V/μs
	Zero-cross voltage	**S21MD4TV**	V_{OX}	Resistance load $I_F = 15mA$	-	-	35	V
Transfer characteristics	Minimun trigger current		I_{FT}	$V_D = 6V$ $R_L = 100\Omega$	-	-	10	mA
	Isolation resistance		R_{ISO}	DC500V 40 to 60% RH	5×10^{10}	10^{11}	-	Ω
	Turn-on time	**S11MD5T**	t_{on}	$V_D = 6V$, $I_F = 20mA$[*4] $R_L = 100\Omega$	-	80	200	μs
		S21MD3TV			-	-	100	μs
		S21MD4TV			-	20	50	μs

*4 **S21MD3TV** : I_F=30mA

Fig. 1 RMS ON-state Current vs. Ambient Temperature
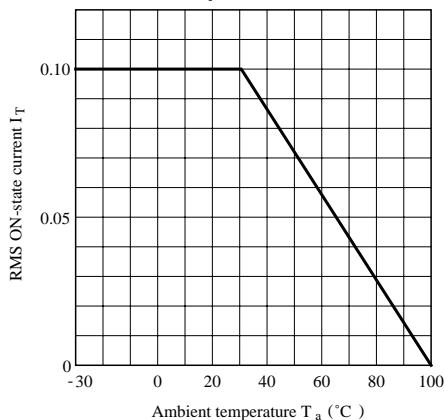
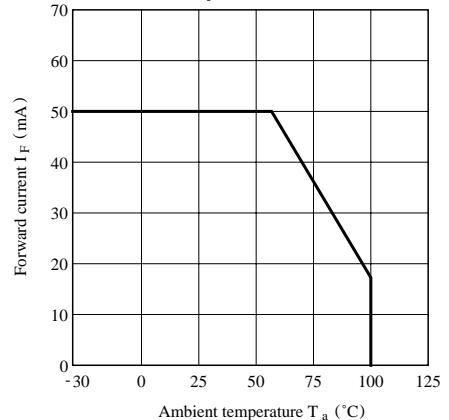**Fig. 2 Forward Current vs. Ambient Temperature**
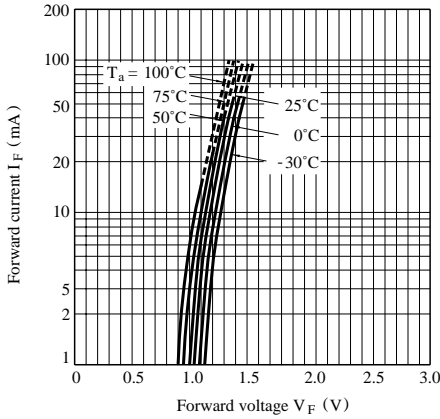
Fig. 3 Forward Current vs. Forward Voltage

Forward current I_F (mA)

$T_a = 100°C$
75°C
50°C
25°C
0°C
-30°C

Forward voltage V_F (V)

Fig. 4 Minimum Trigger Current vs. Ambient Temperature

$V_D = 6V$
$R_L = 100\Omega$

Minimum trigger current I_{FT} (mA)

S11MD5T
S21MD3TV
S21MD4TV

Ambient temperature T_a (°C)
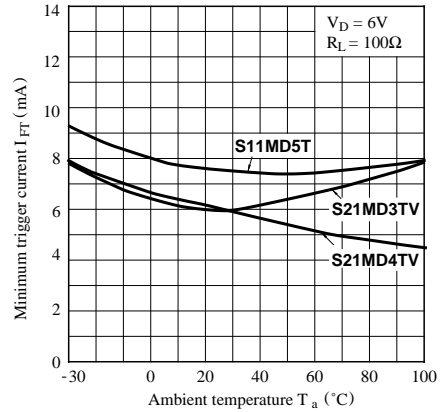
Fig. 5 Relative Repetitive Peak OFF-state Voltage vs. Ambient Temperature
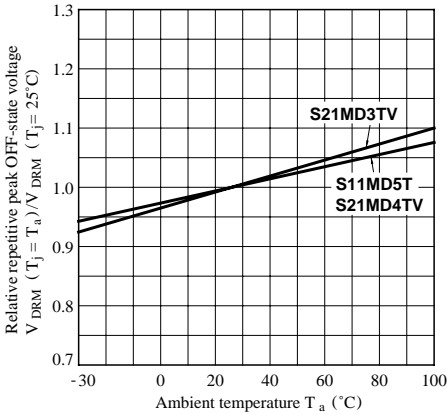
Relative repetitive peak OFF-state voltage
V_{DRM} $(T_j = T_a)/V_{DRM}$ $(T_j = 25°C)$

S21MD3TV
S11MD5T
S21MD4TV

Ambient temperature T_a (°C)

Fig. 6-a ON-state Voltage vs. Ambient Temperature
(S11MD5T)

$I_T = 100mA$

ON-state voltage V_T (V)

Ambient temperature T_a (°C)

Fig. 6-b ON-state Voltage vs. Ambient Temperature
(S21MD3TV/S21MD4TV)

$I_T = 100mA$
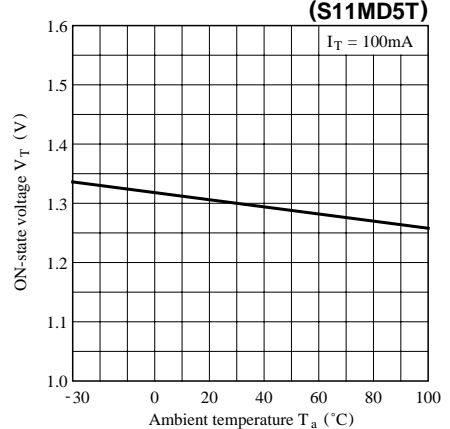
ON-state voltage V_T (V)

S21MD3TV
S21MD4TV

Ambient temperature T_a (°C)
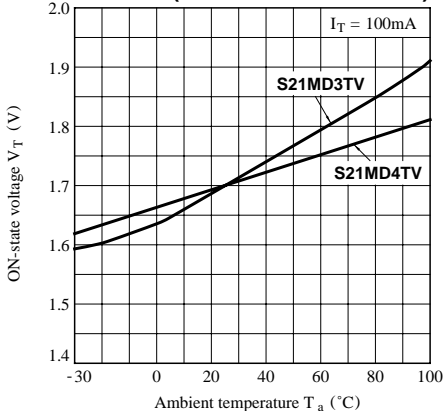
Fig. 7 Holding Current vs. Ambient Temperature
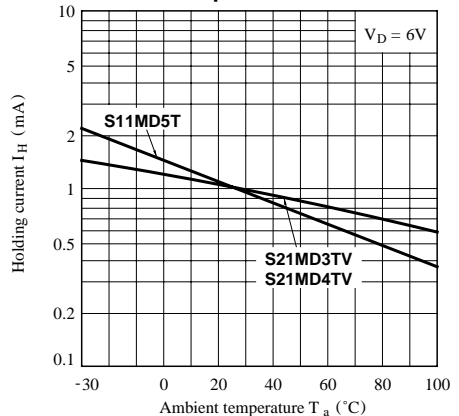
$V_D = 6V$

Holding current I_H (mA)

S11MD5T
S21MD3TV
S21MD4TV

Ambient temperature T_a (°C)

Fig. 8-a Repetitive Peak OFF-state Current vs. OFF-state Voltage
(S11MD5T)

Repetitive peak OFF-state current I_{DRM} (A) vs. OFF-state voltage V_D (V)

$T_a = 25°C$

Fig. 8-b Repetitive Peak OFF-state Current vs. OFF-state Voltate
(S21MD3TV/S21MD4TV)

Repetitive peak OFF-state current I_{DRM} (A) vs. OFF-state voltage V_D (V)

$T_a = 25°C$

S21MD4TV

S21MD3TV

Fig. 9-a Repetitive Peak OFF-state Current vs. Ambient Temperature
(S11MD5T)

Repetitive peak OFF-state current I_{DRM} (A) vs. Ambient temperature T_a (°C)

$V_{DRM} = $ Rated

Fig. 9-b Repetitive Peak OFF-state Current vs. Ambient Temperature
(S21MD3TV/S21MD4TV)

Repetitive peak OFF-state current I_{DRM} (A) vs. Ambient temperature T_a (°C)

$V_{DRM} = $ Rated

S21MD4TV

S21MD3TV
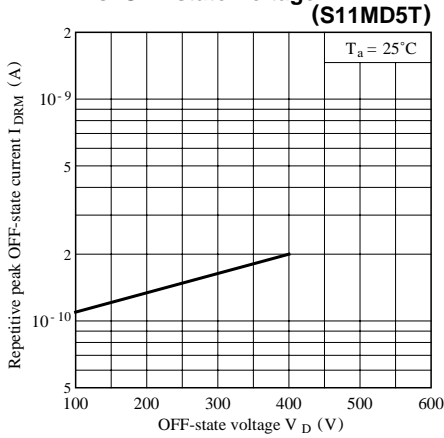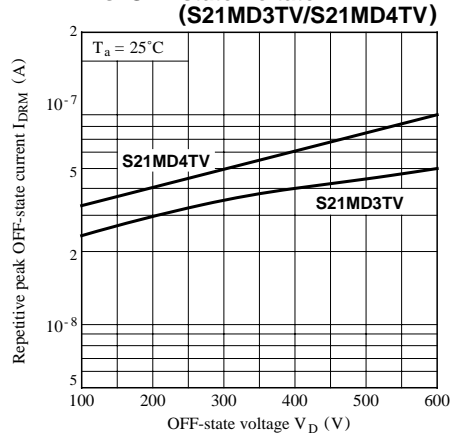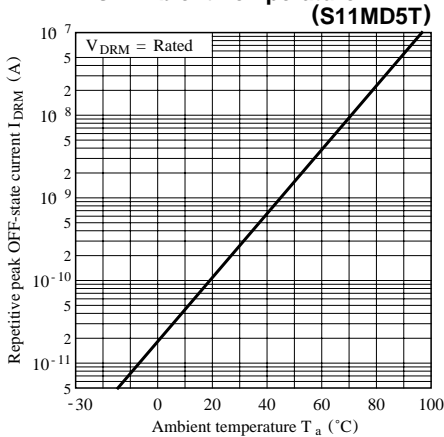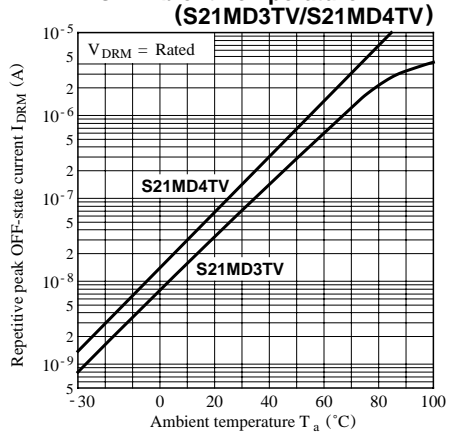
Fig.10 Turn-on Time vs. Forward Current
(S11MD5T/S21MD3TV)

Turn-on time t_{on} (μs) vs. Forward current I_F (mA)

$V_D = 6V$
$R_L = 100Ω$
$T_a = 25°C$

S11MD5T

S21MD3TV
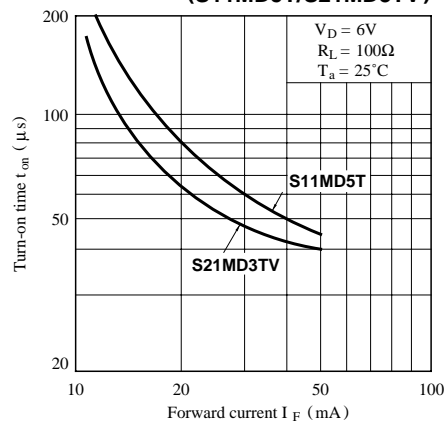
Fig.11 Zero-cross Voltage vs. Ambient Temperature
(S21MD4TV)

Zero-cross voltage V_{OX} (V) vs. Ambient temperature T_a (°C)

R load
$I_F = 15mA$
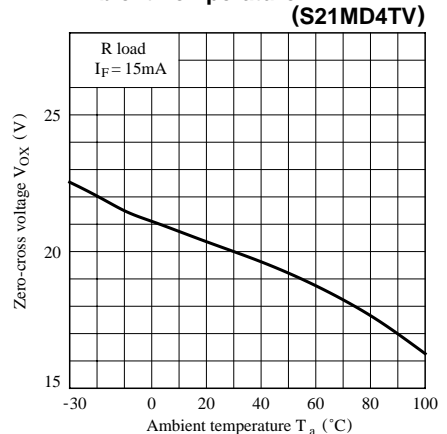
Fig.12 ON-state Current vs.
ON-state Voltage

$I_F = 20mA$
$T_a = 25°C$

ON-state current I_T (mA)

ON-state voltage V_T (V)

S11MD5T
S21MD3TV
S21MD4TV
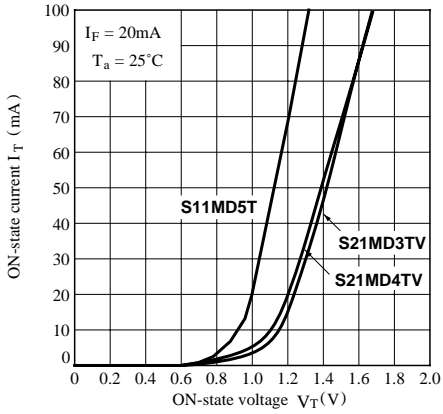
■ **Basic Operation Circuit**

Medium/High Power Triac Drive Circuit

$+V_{CC}$

V_{IN}

Zero-cross Circuit

Load

AC100V : **S11MD5T**
AC200V : **S21MD3TV**
S21MD4TV
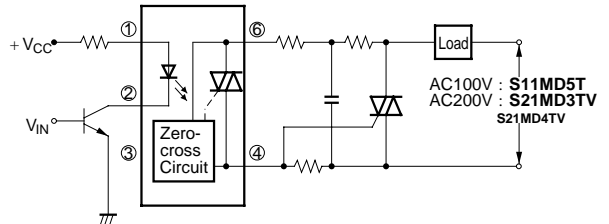
Note）Please use on condition of the triac for power triggers.
Zero-cross circuit is applied to **S21MD4TV**.

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

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— Audio visual equipment
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— Gas leakage sensor breakers
— Alarm equipment
— Various safety devices, etc.

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