# S105T01/S105T02 S205T01/S205T02

## Low Profile Type Solid State Relays

## ■ Features

1. Low profile type (height : 16mm)
2. Built-in zero-cross circuit **(S105T02/S205T02)**
3. RMS ON-state current $I_T$ : MAX. 5Arms
4. Approved by TÜV, No. R9750790 **(S205TY1/S205TY2)**
   Input-Output : Basic Insulation

## ■ Applications

1. Programmable controllers
2. Air conditioners
3. Copiers
4. Automatic vending machines

## ■ Model line-ups

| | For 100V lines | For 200V lines |
|---|---|---|
| No zero-cross circuit | **S105T01** | **S205T01** |
| Built-in zero-cross circuit | **S105T02** | **S205T02** |

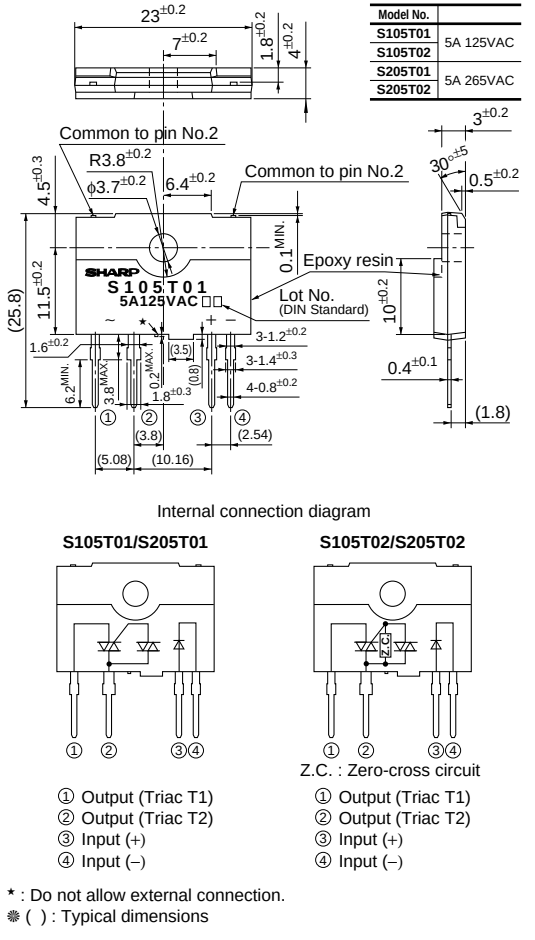
## ■ Absolute Maximum Ratings (Ta=25°C)

| | Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|---|
| Input | Forward current | | $I_F$ | 50 | mA |
| | Reverse voltage | | $V_R$ | 6 | V |
| Output | RMS ON-state current | | $I_T$ | *1 5 | $A_{rms}$ |
| | *2 Peak one cycle surge current | | $I_{surge}$ | 50 | A |
| | Repetitive peak OFF-state voltage | **S105T01** **S105T02** | $V_{DRM}$ | 400 | V |
| | | **S205T01** **S205T02** | | 600 | |
| | Non-repetitive peak OFF-state voltage | **S105T01** **S105T02** | $V_{DSM}$ | 400 | V |
| | | **S205T01** **S205T02** | | 600 | |
| | Critical rate of rise of ON-state current | | $dI_T/dt$ | 50 | A/μs |
| | Operating frequency | | f | 45 to 65 | Hz |
| | Operating temperature | | $T_{opr}$ | –25 to +100 | °C |
| | Storage temperature | | $T_{stg}$ | –30 to +125 | °C |
| | *3 Isolation voltage | | $V_{iso}$ | 3.0 | $kV_{rms}$ |
| | *4 Soldering temperature | | $T_{sol}$ | 260 | °C |

*1 Refer to Fig.2, Fig.3
*2 60Hz sine wave, start at Tj=25°C
*3 Isolation voltage measuring method
(1) Dielectric withstand voltage tester with zero cross circuit shall be used.
(2) The applied voltage waveform shall be sine wave.
(3) Voltage shall be applied between input and output.
(Input and output terminals shall be shorted respectively.)
(4) AC 60Hz, 1min, 40 to 60%RH.
*4 For 10s

## ■ Outline Dimensions

(Unit : mm)

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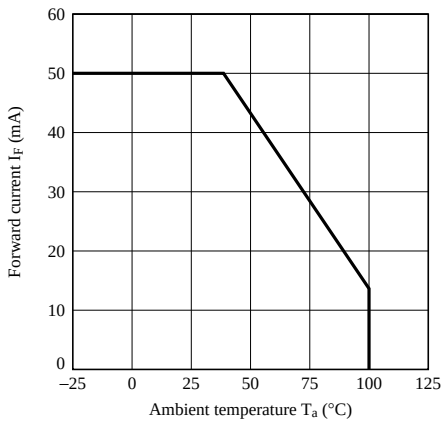
## ■ Electro-optical Characteristics

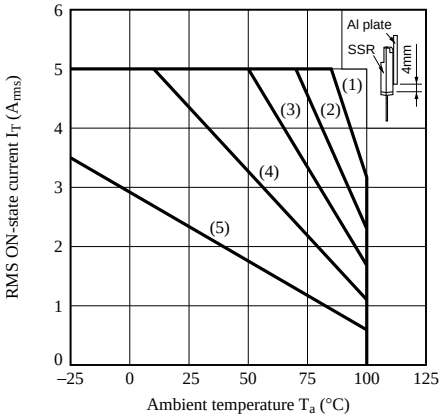
(Ta=25°C)

| | 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 | – | – | $1\times10^{-4}$ | A |
| Output | Repetitive peak OFF-state current | | $I_{DRM}$ | $V_D=V_{DRM}$ | – | – | $1\times10^{-4}$ | A |
| | ON-state voltage | | $V_T$ | $I_T$=2$A_{rms}$, Resistance load, $I_F$=20mA | – | – | 1.5 | $V_{rms}$ |
| | Holding current | | $I_H$ | – | – | – | 50 | mA |
| | Critical rate of rise of OFF-state voltage | | dV/dt | $V_D$=2/3$V_{DRM}$ | 30 | – | – | V/μs |
| | Critical rate of rise of OFF-state voltage at commutaion | | $(dV/dt)_C$ | $T_j$=125°C, $V_D$=2/3$V_{DRM}$, $dI_t/dt$=–2.5A/ms | 5 | – | – | V/μs |
| Transfer characteristics | Minimum trigger current | **S105T01/S205T01** | $I_{FT}$ | $V_D$=12V, $R_L$=30Ω | – | – | 8 | mA |
| | | **S105T02/S205T02** | | $V_D$=6V, $R_L$=30Ω | | | | |
| | Zero cross voltage | **S105T02/S205T02** | $V_{OX}$ | $I_F$=8mA | – | – | 35 | V |
| | Isolation resistance | | $R_{iso}$ | DC500V, 40 to 60%RH | $1\times10^{10}$ | – | – | Ω |
| | Turn-on time | **S105T01** | $t_{on}$ | $V_D$=100$V_{rms}$, AC50Hz, $I_T$=2$A_{rms}$, Resistance load, $I_F$=20mA | – | – | 1 | ms |
| | | **S105T02** | | | – | – | 10 | |
| | | **S205T01** | | $V_D$=200$V_{rms}$, AC50Hz, $I_T$=2$A_{rms}$, Resistance load, $I_F$=20mA | – | – | 1 | |
| | | **S205T02** | | | – | – | 10 | |
| | Turn-off time | **S105T01** | $t_{off}$ | $V_D$=100$V_{rms}$, AC50Hz, $I_T$=2$A_{rms}$, Resistance load, $I_F$=20mA | – | – | 10 | ms |
| | | **S105T02** | | | | | | |
| | | **S205T01** | | $V_D$=200$V_{rms}$, AC50Hz, $I_T$=2$A_{rms}$, Resistance load, $I_F$=20mA | | | | |
| | | **S205T02** | | | | | | |
| Thermal resistance (Between junction and case) | | | $R_{th}$(j-c) | – | – | 5 | – | °C/W |
| Thermal resistance (Between junction and ambience) | | | $R_{th}$(j-a) | – | – | 45 | – | °C/W |

## Fig.1 Forward Current vs. Ambient Temperature

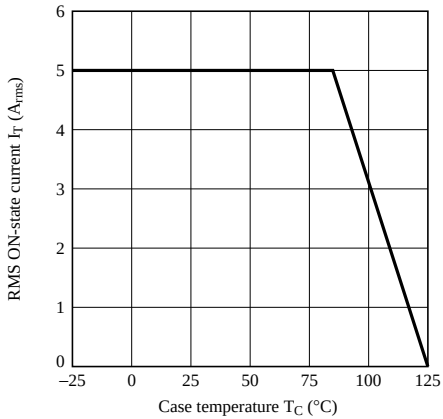


## Fig.2 RMS ON-state Current vs. Ambient Temperature

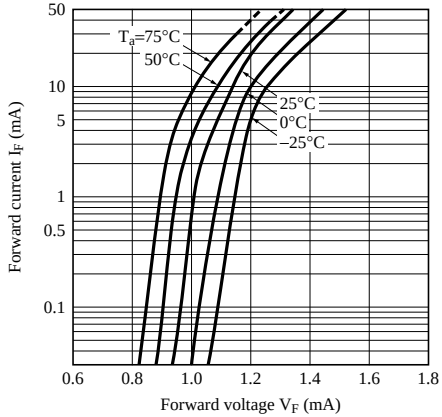



(1) With infinite heat sink
(2) With heat sink (200×200×2mm Al plate)
(3) With heat sink (100×100×2mm Al plate)
(4) With heat sink (50×50×2mm Al plate)
(5) Without heat sink
(Note) With the Al heat sink set up vertically, tighten the device with a torque of 0.4N•m and apply thermal conductive silicone grease on the mounting face of heat sink. Forced cooling shall not be carried out. (Please use an isolation sheet if necessary.)

## Fig.3 RMS ON-state Current vs. Case Temperature




## Fig.4 Forward Current vs. Forward Voltage




## Fig.5 Surge Current vs. Power-on Cycle

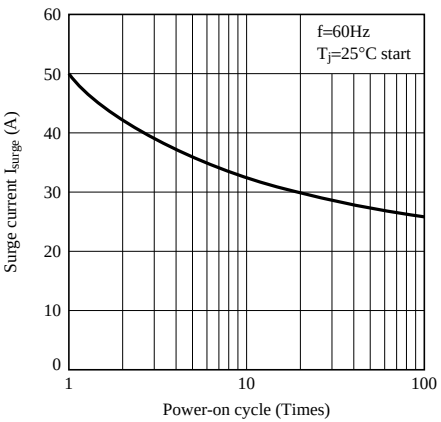


**Fig.6 Minimum Trigger Current vs. Ambient Temperature (Typical Value)**

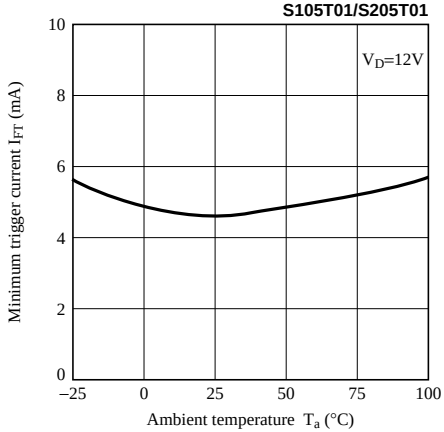



**Fig.7 Minimum Trigger Current vs. Ambient Temperature (Typical Value)**

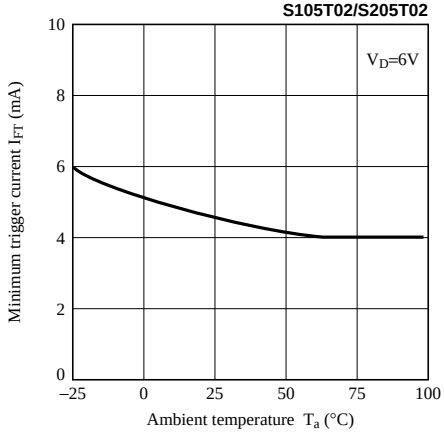



**Fig.8 Maximum ON-state Power Dissipation vs. RMS ON-state Current (Typical Value)**

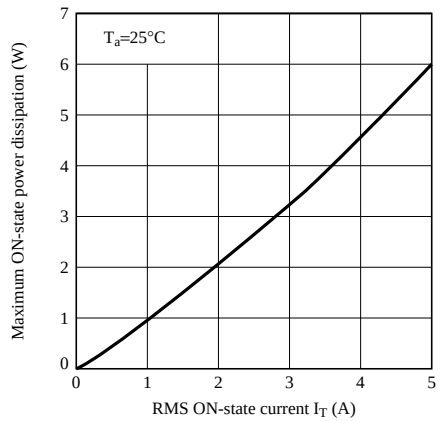



**Fig.9 Repetitive Peak OFF-state Current vs. Ambient Temperature**

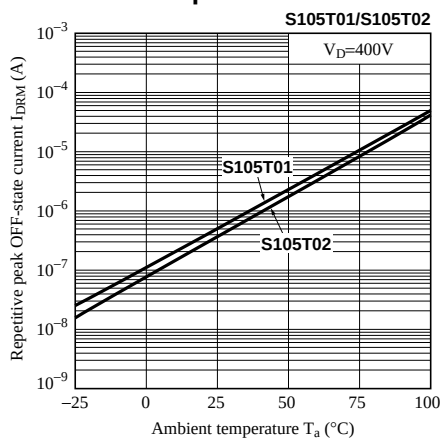
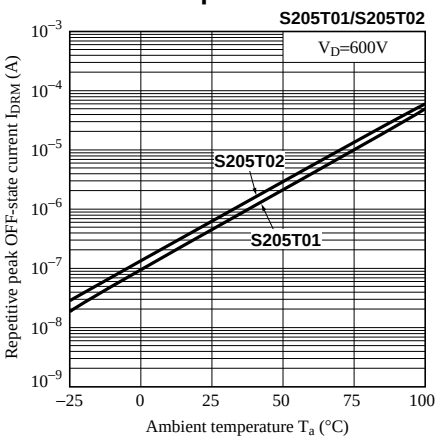



**Fig.10 Repetitive Peak OFF-state Current vs. Ambient Temperature**



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