NEC

TRIAC

# AC01DJM

## 1 A POWER MINI MOLD TRIAC

### DESCRIPTION

The AC01DJM is all diffused type TRIAC granted RMS On-state Current 1 Amps, with rated voltages up to 400 volts.

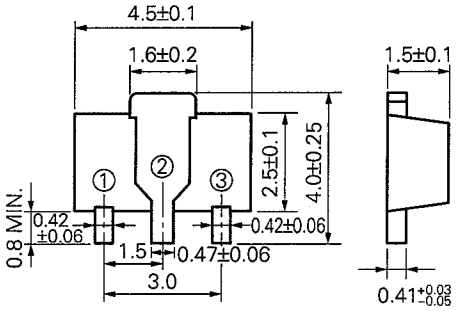
This is designed specifically to be driven by low-level logic in any gating mode.

### FEATURES

- The AC01DJM offers sensitive gate specs of 5 and 10 mA, in all for quadrants.
- You can fill the gap between microprocessor controls and the power-output requirements.
- This is housed in the popular SOT-89 package.
- The package features excellent environmental stress and temperature cycling.

### PACKAGE DIMENSIONS

(in millimeters)




Pin Connections

1. $T_1$ Terminal
2. $T_2$ Terminal
3. Gate

* Measure point of Case Temperature

### QUALITY GRADE

Standard

Please refer to "Quality grade on NEC Semiconductor Devices" (Document number IEI-1209) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

### APPLICATIONS

Solid-state relays, microprocessor interfacing, TTL logic and various solid-state switch designs alone or with larger TRIAC.

### ABSOLUTE MAXIMUM RATINGS ($T_a$ = 25 °C)

| CHARACTERISTIC | SYMBOL | MAXIMUM RATINGS | UNIT | NOTE |
|---|---|---|---|---|
| Repetitive Peak Off Voltage | $V_{DRM}$ | 400 | V | |
| Non-repetitive Peak Off Voltage | $V_{DSM}$ | 500 | V | |
| RMS On-State Current | $I_{T(RMS)}$ | 1 ($T_C$ = 113 °C) | A | See Fig. 12 |
| Peak Surge On-State Current | $I_{TSM}$ | 7 (50 Hz), 8 (60 Hz) | A | See Fig. 2 |
| Fusing Current | $\int i^2Tdt$ | 0.2 (1 ms ≦ t ≦ 10 ms) | $A^2s$ | |
| Peak Gate Power Dissipation | $P_{GM}$ | 1 (f ≧ 50 Hz, Duty ≦ 10 %) | W | |
| Average Gate Power Dissipation | $P_{G(AV)}$ | 0.1 | W | |
| Peak Gate Current | $I_{GM}$ | ±0.5 (f ≧ 50 Hz, Duty ≦ 10 %) | A | |
| Junction Temperature | $T_j$ | 125 | °C | |
| Storage Temperature | $T_{stg}$ | −55 to +150 | °C | |

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## ELECTRICAL CHARACTERISTICS ($T_a$ = 25 °C)

| CHARACTERISTIC | | SYMBOL | TEST CONDITIONS | | MIN. | TYP. | MAX. | UNIT | NOTE |
|---|---|---|---|---|---|---|---|---|---|
| Peak Off-State Current | | $I_{DRM}$ | $V_{DM}$ = $V_{DRM}$ | $T_j$ = 25 °C | – | – | 10 | μA | |
| | | | | $T_j$ = 125 °C | – | – | 100 | | |
| On-State Voltage | | $V_{TM}$ | $I_{TM}$ = 1.2 A | | – | – | 1.5 | V | See Fig. 1 |
| DC Gate Trigger Current | MODE I | $I_{GT}$ | $V_{DM}$ = 12 V, $R_L$ = 100 Ω | G; Positive, $T_2$; Positive | – | – | 5 | mA | See Fig. 5, 7 |
| | II | | | G; Negative, $T_2$; Positive | – | – | 10 | | |
| | III | | | G; Negative, $T_2$; Negative | – | – | 5 | | |
| | IV | | | G; Positive, $T_2$; Negative | – | – | 5 | | |
| DC Gate Trigger Voltage | MODE I | $V_{GT}$ | $V_{DM}$ = 12 V, $R_L$ = 100 Ω | G; Positive, $T_2$; Positive | – | – | 1.0 | V | See Fig. 6, 8 |
| | II | | | G; Negative, $T_2$; Positive | – | – | 1.5 | | |
| | III | | | G; Negative, $T_2$; Negative | – | – | 1.0 | | |
| | IV | | | G; Positive, $T_2$; Negative | – | – | 1.0 | | |
| Gate Non-Trigger Voltage | | $V_{GD}$ | $T_j$ = 125 °C, $V_{DM}$ = 1/2 $V_{DRM}$ | | 0.1 | – | – | V | |
| DC Holding Current | | $I_H$ | $V_D$ = 24 V, $I_{TM}$ = 1 A | | – | – | 10 | mA | |
| Critical Rate of Rise of Off-State Voltage | | dv/dt | $T_j$ = 125 °C, $V_{DM}$ = 2/3 $V_{DRM}$ Gate Open Circuited Exponential Waveform | | – | 10 | – | V/μs | |
| Critical Rate of Rise of Commutating Off-State Voltage | | (dv/dt)c | $T_j$ = 125 °C, $I_{TM}$ = 1.2 A (di$_T$/dt)c = –0.5 A/ms $V_{DM}$ = 400 V | | 0.5 | – | – | V/μs | |
| Steady State | | $R_{th(j-c)}$ | Junction to Case | | – | – | 10 | °C/W | See Fig. 13 |
| Thermal Resistance | | $R_{th(j-a)}$ | Junction to Ambient | | – | – | 120 | °C/W | |

## TYPICAL CHARACTERISTICS ($T_a$ = 25 °C)

Fig. 1 $i_T$ – $V_T$ CHARACTERISTIC

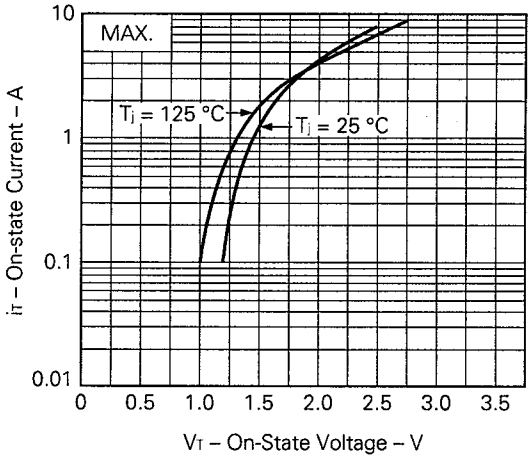



Fig. 2 $I_{TSM}$ RATING

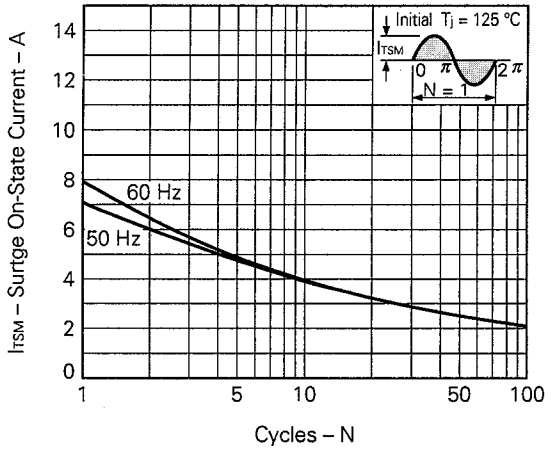


Fig. 3 $V_G$ – $I_G$ RATING

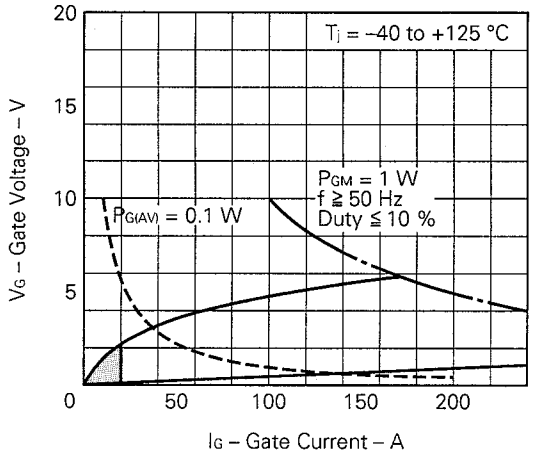



Fig. 4 GATE CHARACTERISTIC

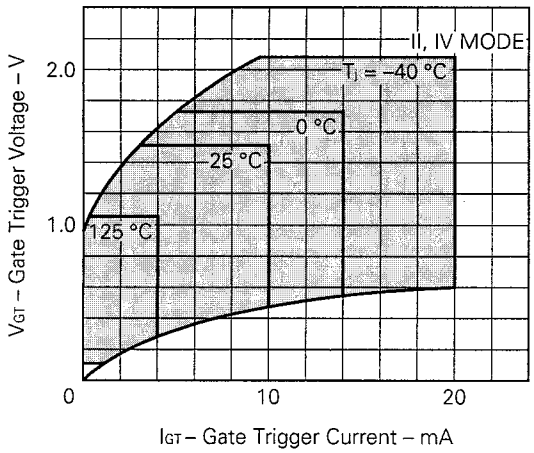



Fig. 5 GATE CHARACTERISTIC

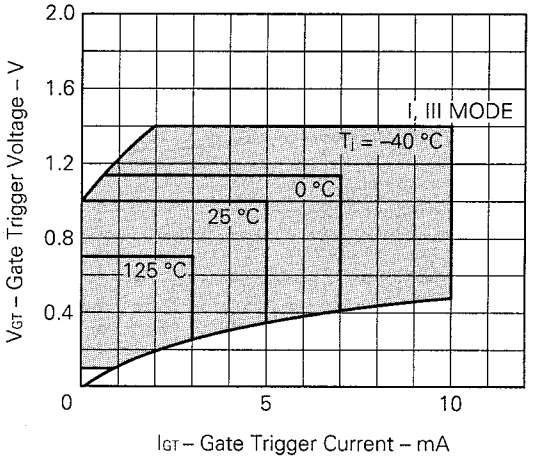



Fig. 6 $I_{GT}$ – $T_a$ TYPICAL DISTRIBUTION

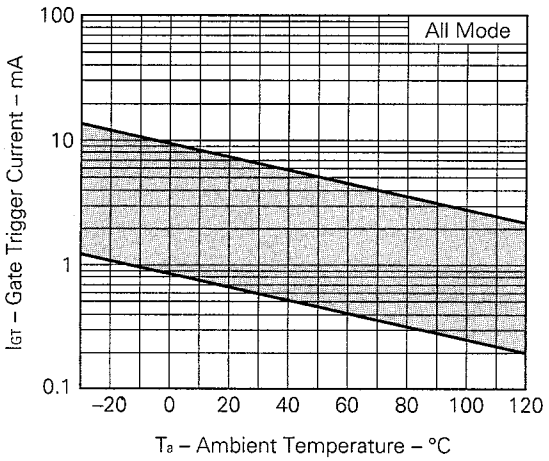



Fig. 7 $V_{GT}$ – $T_a$ TYPICAL DISTRIBUTION

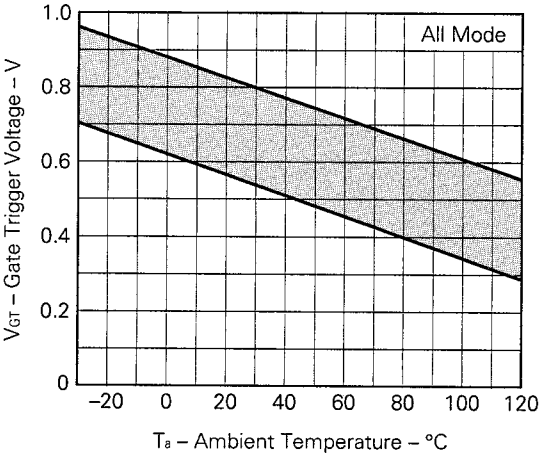



Fig. 8 $i_{GT}$ – $\tau$ TYPICAL DISTRIBUTION

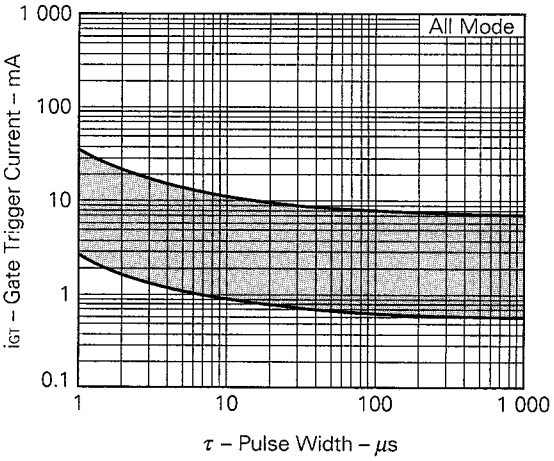


Fig. 9 $\upsilon_{GT}$ – $\tau$ TYPICAL DISTRIBUTION

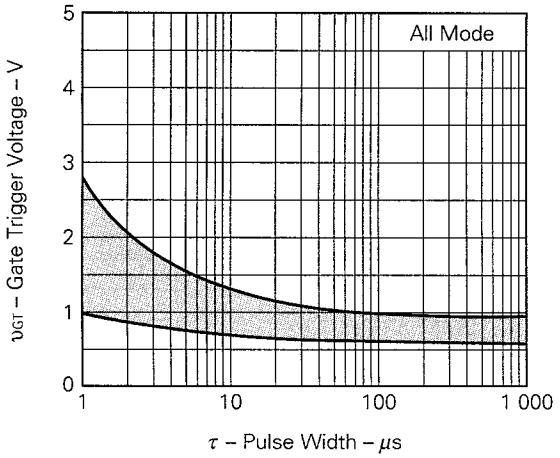



Fig. 10 $I_H$ – $T_a$ TYPICAL DISTRIBUTION

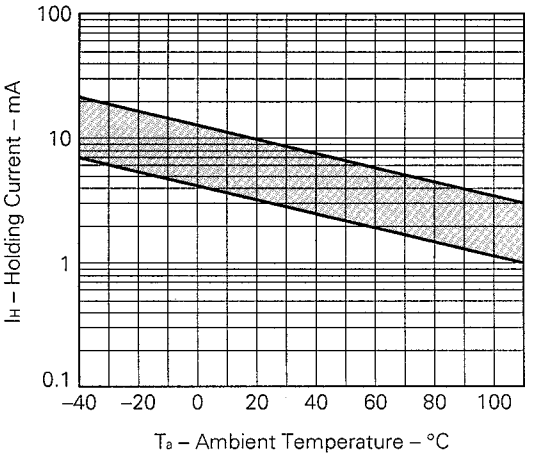



Fig. 11 $P_{T(AV)}$ – $I_{T(RMS)}$ CHARACTERISTIC

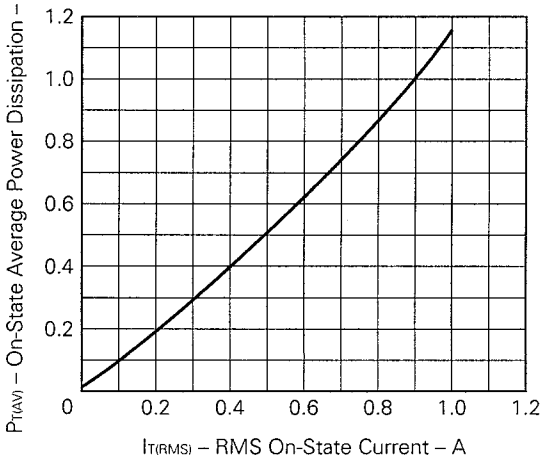



Fig. 12 $T_C$ – $I_{T(RMS)}$ RATING

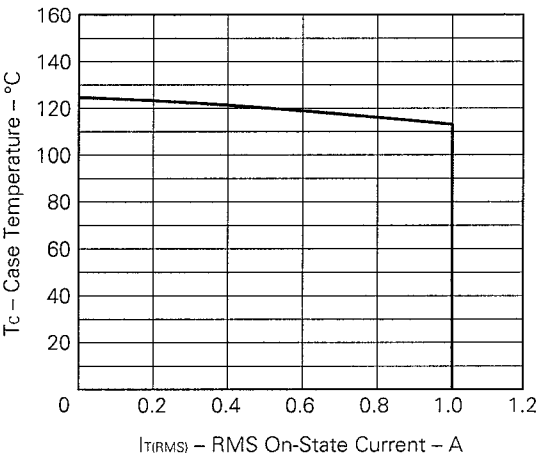



Fig. 13 $T_a$ – $I_{T(RMS)}$ RATING

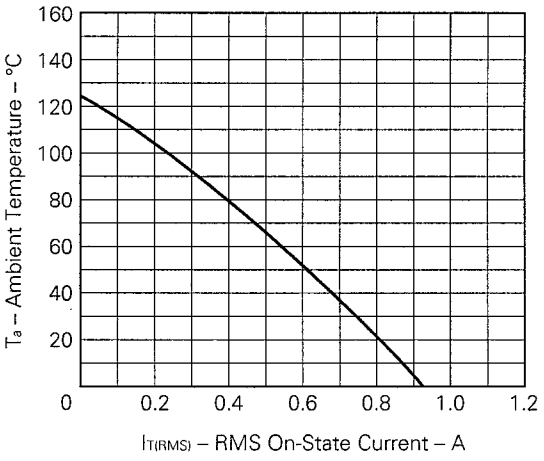
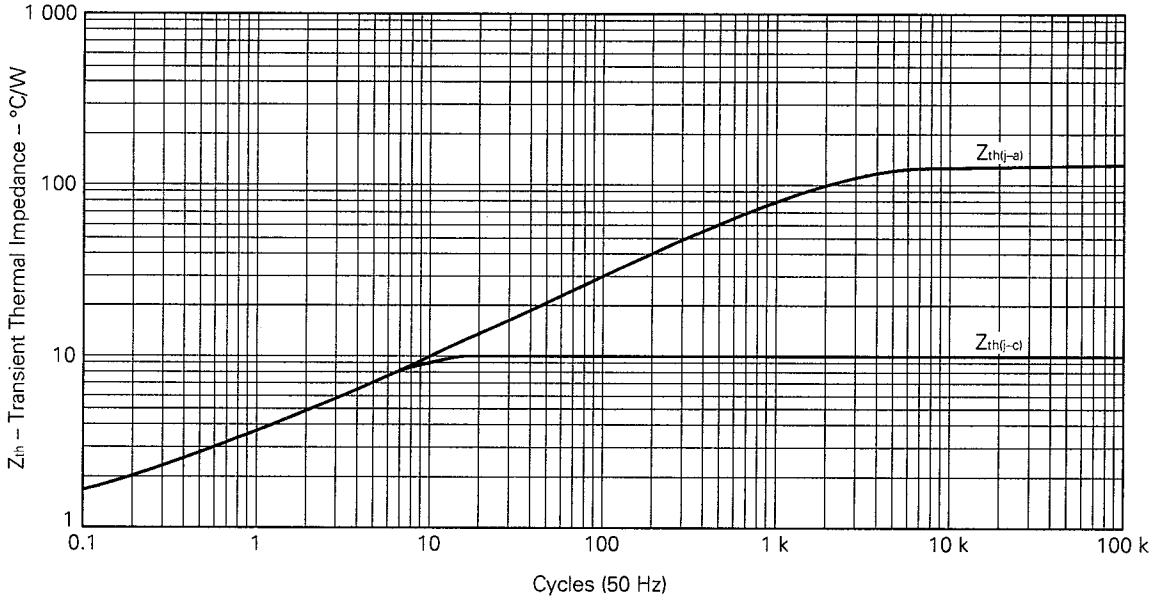


Fig. 14 $Z_{th}$ CHARACTERISTIC




## REFERENCE

| Document name | Document No. |
|---|---|
| Quality control guide of semiconductor devices | MEI-1202 |
| Assembly manual of semiconductor devices | IEI-1207 |

[MEMO]



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