

4855452 INTERNATIONAL RECTIFIER

55C 04870 D

Data Sheet No. E2584B

INTERNATIONAL RECTIFIER



T-25-15

## T50AC-A, 50AC-A SERIES

50A power triacs

### Major Ratings and Characteristics

|                                              | T50AC-A     | 50AC-A | Units            |
|----------------------------------------------|-------------|--------|------------------|
| $I_T(\text{RMS})$ @ $T_c = 85^\circ\text{C}$ | —           | 50     | A                |
| $I_T(\text{RMS})$ @ $T_c = 75^\circ\text{C}$ | 50          | —      | A                |
| $I_{TSM}$ 50Hz                               | 520         |        | A                |
| $I_{TSM}$ 60Hz                               | 550         |        | A                |
| $I^2t$ 50Hz                                  | 1350        |        | A <sup>2</sup> s |
| $I^2t$ 60Hz                                  | 1250        |        | A <sup>2</sup> s |
| $di/dt$                                      | 100         |        | A/ $\mu$ s       |
| $I_{GT}$                                     | 200         |        | mA               |
| $dv/dt$ (commutating)                        | 15          |        | V/ $\mu$ s       |
| $T_J$                                        | —40 to 125  |        | $^\circ\text{C}$ |
| $V_{RRM}, V_{DRM}$                           | 400 to 1200 |        | V                |

### Description

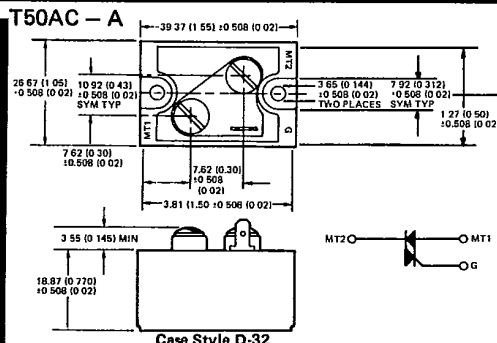
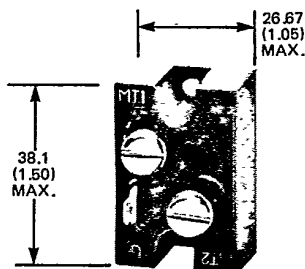
International Rectifier offers two ranges of 50A power triacs, the first is the 50AC-A range in a standard TO-65 package and the second is the T50AC-A range in the isolated base package. Applications include lamp dimmers and other industrial equipment.

### Features

- High surge capability
- Choice of package style
  - 1/4" stud
  - Isolated base
- Available up to 1200V  $V_{RRM}, V_{DRM}$
- High dynamic characteristics.

A

### CASE STYLE AND DIMENSIONS



Case Style D-32

All Dimensions in Millimeters and (Inches)

For 50AC-A case style see page A-77.

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T50AC-A, 50AC-A Series

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### ELECTRICAL SPECIFICATIONS

#### Voltage ratings

| Part Number | V <sub>RRM</sub> , V <sub>DRM</sub> , Maximum repetitive peak reverse and off-state voltage gate open circuited | V <sub>RSM</sub> Maximum non-repetitive peak reverse voltage |
|-------------|-----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
|             | V                                                                                                               | V                                                            |
| T50AC40A    | 400                                                                                                             | 500                                                          |
| T50AC80A    | 800                                                                                                             | 700                                                          |
| T50AC80A    | 800                                                                                                             | 900                                                          |
| T50AC100A   | 1000                                                                                                            | 1100                                                         |
| T50AC120A   | 1200                                                                                                            | 1300                                                         |

#### On-State

|                                                                           | T50AC-A | 50AC-A | Units             | Conditions                                                                                      |
|---------------------------------------------------------------------------|---------|--------|-------------------|-------------------------------------------------------------------------------------------------|
| I <sub>T(RMS)</sub> Maximum RMS on-state current                          | 50      |        | A                 | Max. T <sub>C</sub> = 85°C : 50AC-A. Max. T <sub>C</sub> = 75°C : T50AC-A                       |
| I <sub>TSM</sub> Maximum peak one cycle non-repetitive surge current      | 380     |        | A                 | t = 20ms Sinusoidal full-wave, Initial T <sub>J</sub> = 125°C, rated V <sub>RRM</sub> reapplied |
|                                                                           | 400     |        | A                 | t = 16.7ms                                                                                      |
| I <sub>TSM</sub> Maximum peak one half-cycle non-repetitive surge current | 620     |        | A                 | t = 10ms 100% rated V <sub>RRM</sub> reapplied                                                  |
|                                                                           | 550     |        | A                 | t = 8.3ms Sinusoidal half-wave Initial T <sub>J</sub> = 125°C Either direction                  |
|                                                                           | 620     |        | A                 | t = 10ms No voltage reapplied                                                                   |
|                                                                           | 650     |        | A                 | t = 8.3ms                                                                                       |
| I <sup>2</sup> t Maximum I <sup>2</sup> t capability for fusing           | 1350    |        | A <sup>2</sup> s  | t = 10ms 100% rated V <sub>RRM</sub> reapplied                                                  |
|                                                                           | 1250    |        | A <sup>2</sup> s  | t = 8.3ms                                                                                       |
|                                                                           | 1900    |        | A <sup>2</sup> s  | t = 10ms No voltage reapplied                                                                   |
|                                                                           | 1760    |        | A <sup>2</sup> s  | t = 8.3ms                                                                                       |
| I <sup>2</sup> /t Maximum I <sup>2</sup> /t capability for fusing ①       | 24 000  |        | A <sup>2</sup> /s | t = 0.1 to 10ms. No voltage reapplied, Initial T <sub>J</sub> ≤ 125°C.                          |
| V <sub>TM</sub> Maximum peak on-state voltage                             | 2.0     |        | V                 | T <sub>J</sub> = 25°C, I <sub>TM</sub> = 70A <sub>pk</sub> , either direction                   |
| I <sub>H</sub> Maximum holding current                                    | 90      |        | mA                | T <sub>J</sub> = 25°C, anode supply = 22V, Initial I <sub>T</sub> = 2A in either direction      |

#### Off-State

|                                                            |      |      |                                                                                       |
|------------------------------------------------------------|------|------|---------------------------------------------------------------------------------------|
| dv/dt Maximum critical rate-of-rise of commutation voltage | 15   | V/μs | T <sub>J</sub> = 125°C, Rated V <sub>RRM</sub> , either direction                     |
| dv/dt Maximum critical rate-of-rise of on-state voltage    | 200  | V/μs | T <sub>J</sub> = 125°C, Exponential to 100% rated V <sub>RRM</sub> , either direction |
| I <sub>DM</sub> Maximum peak off-state current             | 10   | mA   | T <sub>J</sub> = 125°C, Rated V <sub>RRM</sub> , either direction                     |
| V <sub>ins</sub> RMS isolation voltage*                    | 2500 | V    | Circuit to base, all terminals shorted                                                |

#### Switching

|                                                                |     |      |                                                                                                                                                                                |
|----------------------------------------------------------------|-----|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| di/dt Maximum non-repetitive rate-of-rise of turned-on current | 100 | A/μs | T <sub>J</sub> = 125°C, V <sub>DRM</sub> = rated V <sub>DRM</sub> , I <sub>TM</sub> = 100A, gate pulse: 20V, 15μs, t <sub>p</sub> ≥ 10μs. Per JEDEC standard RS - 397, 5.2.2.6 |
|----------------------------------------------------------------|-----|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

#### Triggering

|                                                                |     |    |                                       |
|----------------------------------------------------------------|-----|----|---------------------------------------|
| P <sub>GM</sub> Maximum peak gate power                        | 10  | W  | 2.0ms pulse width                     |
| P <sub>G(AV)</sub> Maximum average gate power                  | 2   | W  |                                       |
| I <sub>GM</sub> Maximum peak positive or negative gate current | 3   | A  |                                       |
| V <sub>GM</sub> Maximum peak positive or negative gate voltage | 20  | V  |                                       |
| I <sub>GT</sub> Maximum DC gate current required to trigger    | 200 | mA | MT2+ gate +                           |
|                                                                | 200 | mA | MT2- gate -                           |
|                                                                | 200 | mA | MT2+ gate -                           |
|                                                                | 200 | mA | MT2- gate +                           |
| V <sub>GT</sub> Maximum DC gate voltage required to trigger    | 2.5 | V  | T <sub>J</sub> = 25°C, 12V MT1 to MT2 |
| V <sub>GD</sub> Maximum required gate voltage not to trigger   | 0.2 | V  |                                       |

\* This refers to T50AC-A series only.

① I<sup>2</sup>t for time t<sub>x</sub> = I<sup>2</sup>√t · √t<sub>x</sub>

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T50AC-A, 50AC-A Series

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## Thermal and Mechanical Specifications

|            |                                                       | T50AC-A          | 50AC-A     | Units  | Conditions                                                                                                                                                                                                                                                                               |
|------------|-------------------------------------------------------|------------------|------------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $T_J$      | Maximum operating temperature range                   | -40 to 125       |            | °C     |                                                                                                                                                                                                                                                                                          |
| $T_{stg}$  | Maximum storage temperature range                     | -40 to 125       |            | °C     |                                                                                                                                                                                                                                                                                          |
| $R_{thJC}$ | Maximum internal thermal resistance, junction to case | 0.70             | 0.45       | K/W    | DC operation                                                                                                                                                                                                                                                                             |
| $R_{thCS}$ | Maximum thermal resistance, case to heatsink          | 0.25             | 0.25       | K/W    | Mounting surface smooth, flat and greased                                                                                                                                                                                                                                                |
| $T$        | Mounting torque      Device to heatsink<br>± 10%      | 15               | 20(27.5)   | lbf.in | 50AC-A. Lubricated (non-lubricated) threads.<br>T50AC-A. M3.5 (6-32UNF) mounting screws. Non-lubricated threads. A mounting grease is recommended and the torque should be re-checked after a period of about 3 hours to allow for spreading of the compound.<br>Non-lubricated threads. |
|            |                                                       | 0.18             | 0.23(0.32) | kgf.m  |                                                                                                                                                                                                                                                                                          |
|            |                                                       | 1.7              | 2.3(3.1)   | Nm     |                                                                                                                                                                                                                                                                                          |
|            |                                                       | 4.5              | —          | lbf.in |                                                                                                                                                                                                                                                                                          |
|            |                                                       | 0.13             | —          | kgf.m  |                                                                                                                                                                                                                                                                                          |
|            | Terminals MT1 and MT2                                 | 1.3              | —          | Nm     |                                                                                                                                                                                                                                                                                          |
| Case style |                                                       | TO-208AC (TO-65) |            |        | JEDEC                                                                                                                                                                                                                                                                                    |
| wt         | Approximate weight                                    | 54 (1.9)         | 28 (1.0)   | g (oz) |                                                                                                                                                                                                                                                                                          |

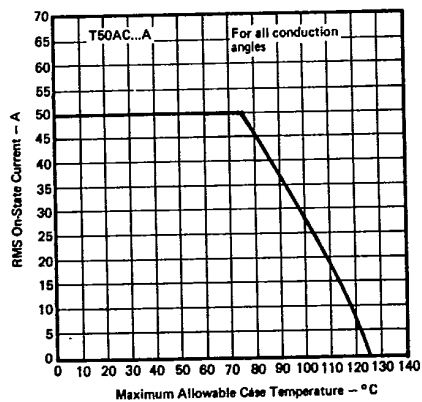
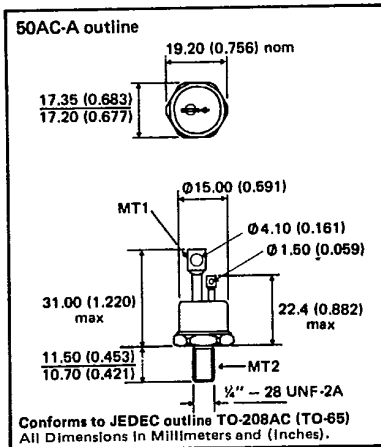


Fig. 1 — RMS On-State Current  
Vs. Maximum Allowable Case Temperature,  
T50AC-A Series

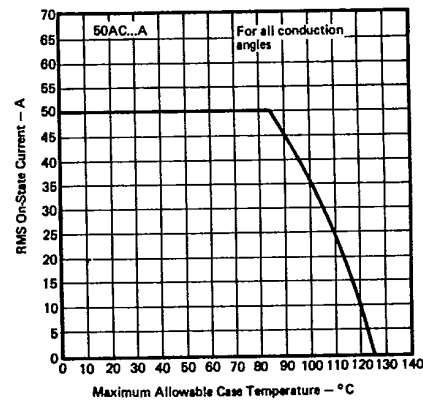


Fig. 2 — RMS On-State Current  
Vs. Maximum Allowable Case Temperature,  
50AC-A Series

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T50AC-A, 50AC-A Series

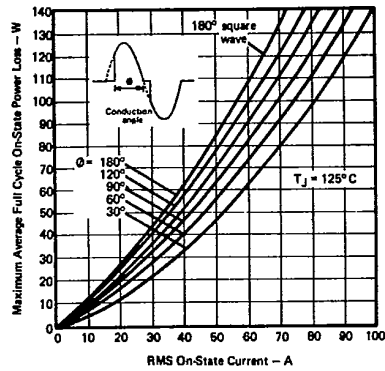


Fig. 3 - Maximum Low Level On-State Power Loss Vs. RMS On-State Current, Both Series

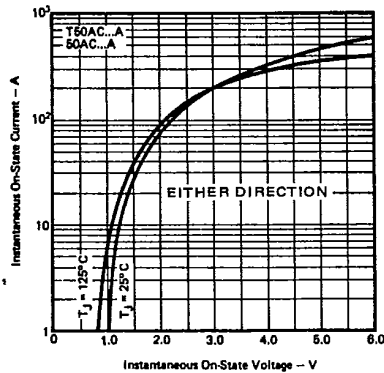


Fig. 5 - Maximum Instantaneous On-State Voltage Vs. Instantaneous On-State Current, Both Series

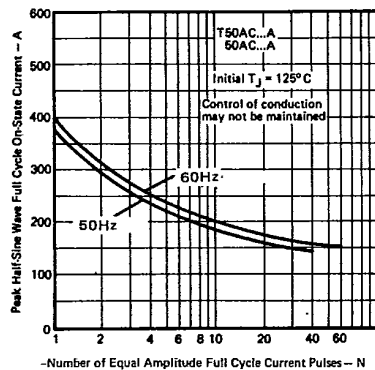


Fig. 7 - Maximum Non-Repetitive Surge Current Vs. Number of Current Pulses, Both Series

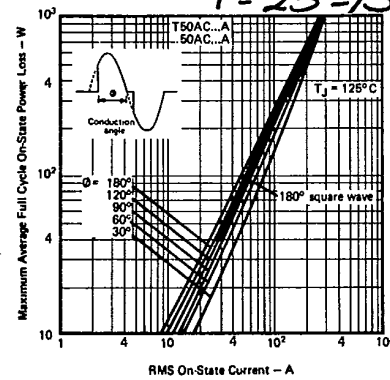
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Fig. 4 - Maximum High Level On-State Power Loss Vs. RMS On-State Current, Both Series

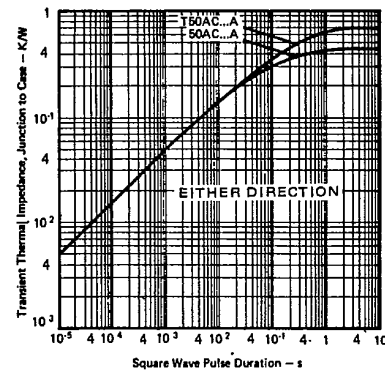


Fig. 6 - Maximum Transient Thermal Impedance Vs. Square Wave Pulse Duration, Both Series

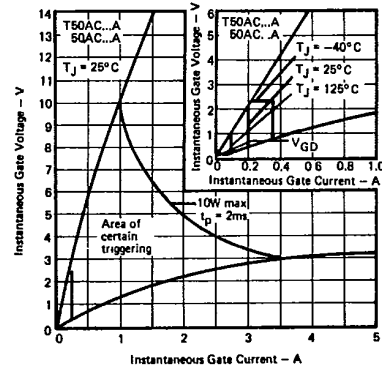


Fig. 8 - Gate Characteristics, Both Series