

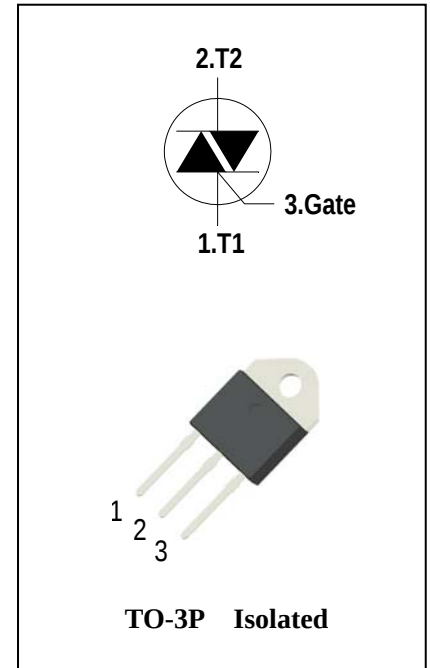
### 3 Quadrants Triacs

#### General Description

High current density due to mesa technology .the AIT40C triac series is suitable for general purpose AC switching. They can be used as an ON/OFF function in applications such as static relays, heating regulation, High power motor controls e.g. washing machines and vacuum cleaners, Rectifier-fed DC inductive loads e.g. DC motors and solenoids , motor speed controllers.

#### Features

- ◆ Repetitive Peak Off-State Voltage: 600V and 800V
- ◆ R.M.S On-State Current (  $I_{T(RMS)} = 40A$  )
- ◆ High Commutation  $dv/dt$
- ◆ These Devices are Pb-Free and are RoHS Compliant
- ◆ Isolated heatsink mounted , Isolation Voltage (  $V_{ISO} = 2500V AC$  )



#### Absolute Maximum Ratings

| Symbol                 | Items                                                          | Conditions                                                                                    |           | Ratings    | Unit        |
|------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------|------------|-------------|
| $V_{DRM}$<br>$V_{RRM}$ | Repetitive Peak Off-State Voltage                              | $T_j = 25^{\circ}C$                                                                           | AIT40C60H | 600        | V           |
|                        |                                                                |                                                                                               | AIT40C80H | 800        | V           |
| $I_{T(RMS)}$           | R.M.S On-State Current                                         | $T_C = 80^{\circ}C$                                                                           |           | 40         | A           |
| $I_{TSM}$              | Surge On-State Current                                         | $t_p=20ms(50Hz)/t_p=16.7ms(60Hz)$                                                             |           | 400/420    | A           |
| $I^2t$                 | $I^2t$ for fusing                                              | $t_p=10ms$                                                                                    |           | 880        | $A^2s$      |
| $di/dt$                | Critical rate of rise of on-state current                      | $F = 120\text{ Hz}$ $T_j = 125^{\circ}C$<br>$I_G = 2 \times I_{GT}$ , $tr \leq 100\text{ ns}$ |           | 55         | $A/\mu s$   |
| $I_{GM}$               | Peak Gate Current                                              | $t_p = 20\text{ }\mu s$ $T_j = 125^{\circ}C$                                                  |           | 8          | A           |
| $P_{G(AV)}$            | Average Gate Power Dissipation( $T_j=125^{\circ}C$ )           |                                                                                               |           | 1          | W           |
| $P_{GM}$               | Peak Gate Power Dissipation( $t_p=20\mu s, T_j=125^{\circ}C$ ) |                                                                                               |           | 10         | W           |
| $T_j$                  | Operating Junction Temperature                                 |                                                                                               |           | - 40 ~ 125 | $^{\circ}C$ |
| $T_{STG}$              | Storage Temperature                                            |                                                                                               |           | - 40 ~ 150 | $^{\circ}C$ |



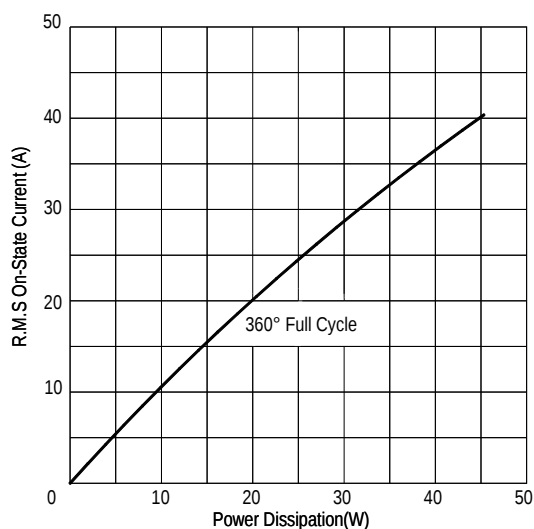
## Electrical Characteristics( $T_j = 25^\circ\text{C}$ unless otherwise specified )

| Symbol                               | Items                                          |                          | Conditions                                                                          |      | AIT40C60HB/80HB | Unit |
|--------------------------------------|------------------------------------------------|--------------------------|-------------------------------------------------------------------------------------|------|-----------------|------|
| I <sub>DRM</sub><br>I <sub>RRM</sub> | Peak Forward Reverse Blocking Current          |                          | V <sub>DRM</sub> = V <sub>RRM</sub> , T <sub>j</sub> = 25°C                         | Max. | 5               | uA   |
|                                      |                                                |                          | V <sub>DRM</sub> = V <sub>RRM</sub> , T <sub>j</sub> = 125°C                        |      | 5               | mA   |
| V <sub>TM</sub>                      | Peak On-State Voltage                          |                          | I <sub>TM</sub> = 60A, t <sub>p</sub> = 380 μs                                      | Max. | 1.55            | V    |
| V <sub>GD</sub>                      | Q1-Q2-Q3                                       | Non—Trigger Gate Voltage | V <sub>D</sub> = V <sub>DRM</sub> R <sub>L</sub> = 3.3 kΩ<br>T <sub>j</sub> = 125°C | Min. | 0.2             | V    |
| V <sub>GT</sub>                      | Q1-Q2-Q3                                       | Gate Trigger Voltage     | V <sub>D</sub> = 12V ,   R <sub>L</sub> = 33Ω                                       | Max. | 1.3             | V    |
| I <sub>GT</sub>                      | Q1-Q2-Q3                                       | Gate Trigger Current     |                                                                                     | Max. | 50              | mA   |
| I <sub>H</sub>                       | Q1-Q2-Q3                                       | Holding Current          | I <sub>T</sub> = 0.5A                                                               | Max. | 75              | mA   |
| I <sub>L</sub>                       | Q1-Q3                                          | Latching Current         | I <sub>G</sub> = 1.2 I <sub>GT</sub>                                                | Max. | 90              | mA   |
|                                      | Q2                                             |                          |                                                                                     |      | 110             |      |
| dV/dt                                | Critical Rate of Rise of Off-State Voltage     |                          | V <sub>D</sub> = 2/3V <sub>DRM</sub> gate open<br>T <sub>j</sub> = 125°C            | Min. | 1500            | V/μs |
| (dV/dt) <sub>c</sub>                 | Critical Rate of Change of Commutating Voltage |                          | (dI/dt) <sub>c</sub> = -20A/ms<br>T <sub>j</sub> = 125°C                            | Min. | 20              | V/μs |
| R <sub>th(j-c)</sub>                 | Junction to case (AC)                          |                          |                                                                                     | Max. | 0.9             | °C/W |
| R <sub>th(j-a)</sub>                 | Junction to ambient                            |                          |                                                                                     | Max. | 50              | °C/W |

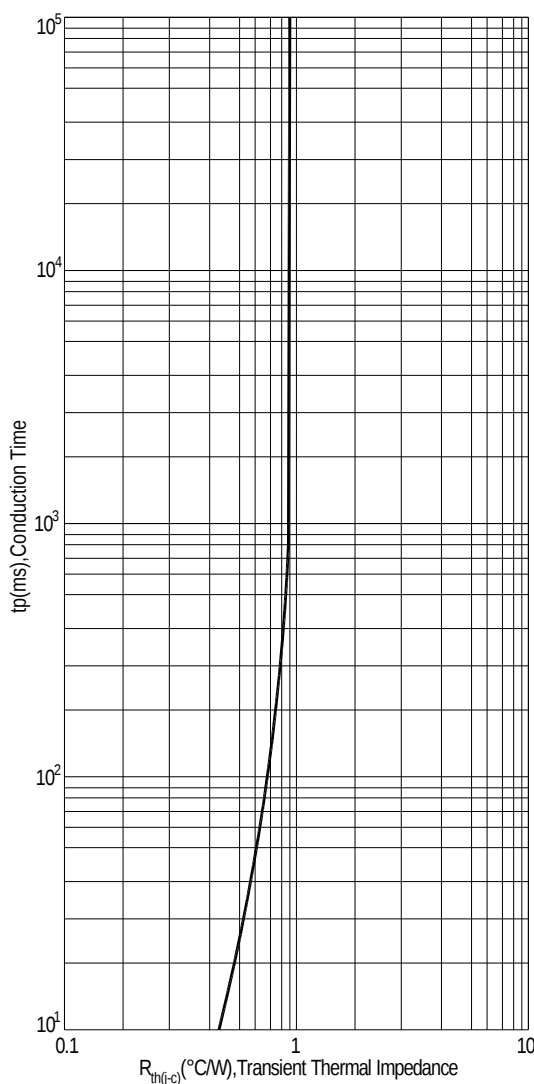
FIG.1: Triac quadrant are defined and the gate trigger test circuit



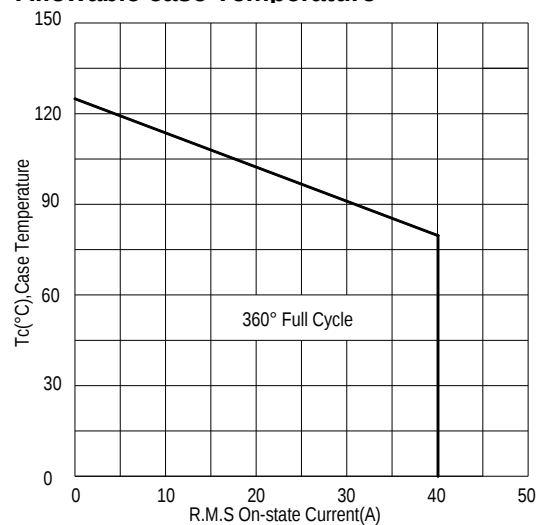
**FIG.2: Maximum on-state power dissipation**



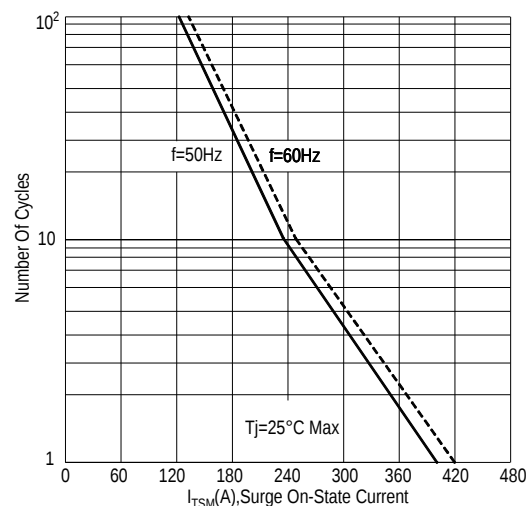
**FIG.4: Maximum transient thermal impedance**



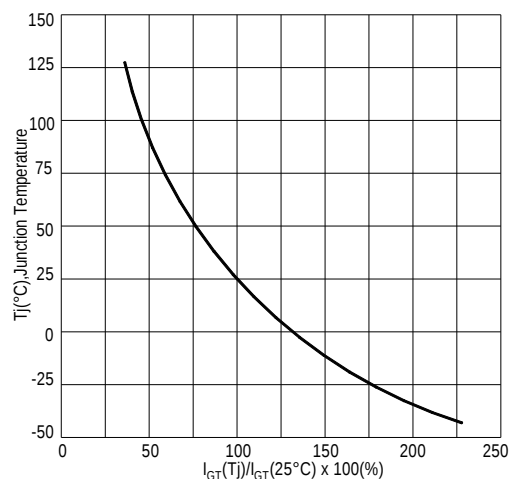
**FIG.3: Typical RMS on-state current VS Allowable case Temperature**



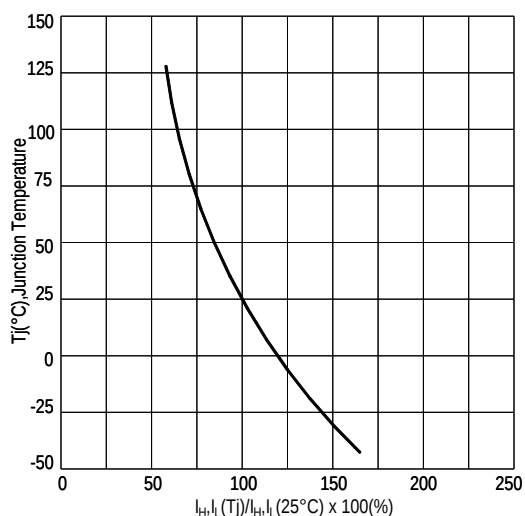
**FIG.5: Rated surge on-state current ( Non-Repetitive)**



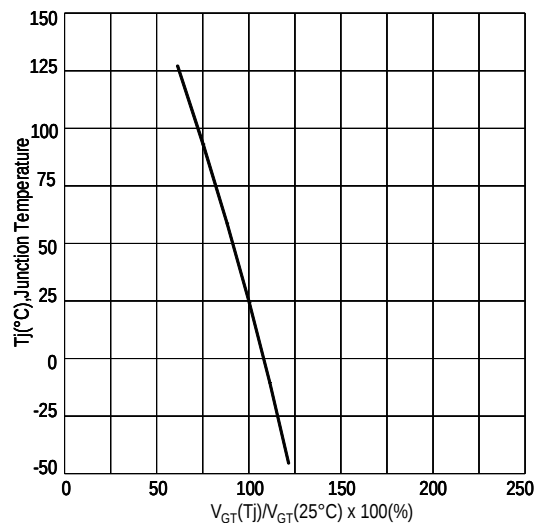
**FIG.6: Gate trigger current VS Junction temperature**



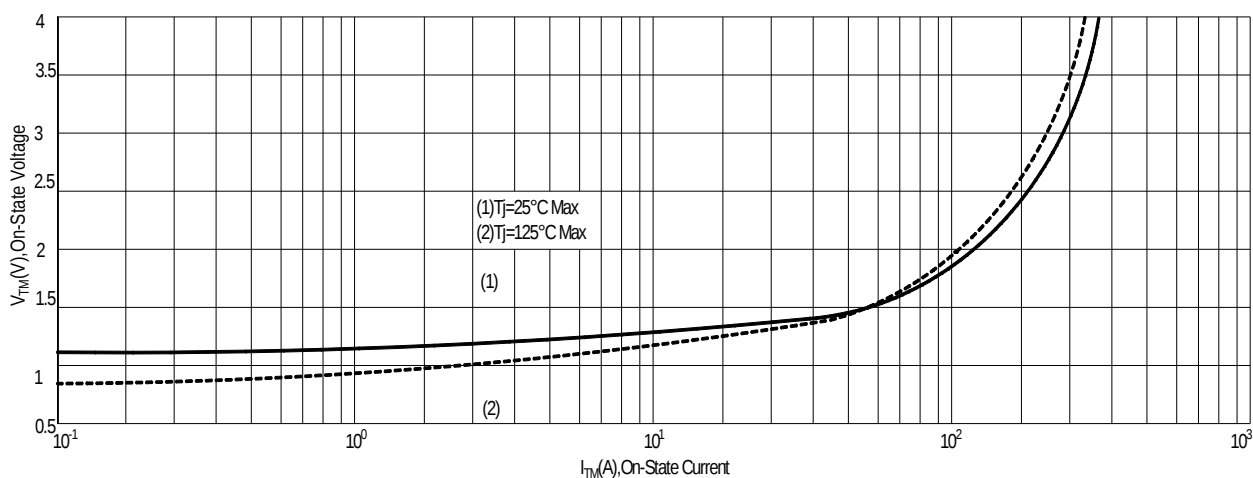
**FIG.7: Holding current and Latching current VS Junction temperature**



**FIG.8: Gate trigger voltage VS Junction temperature**

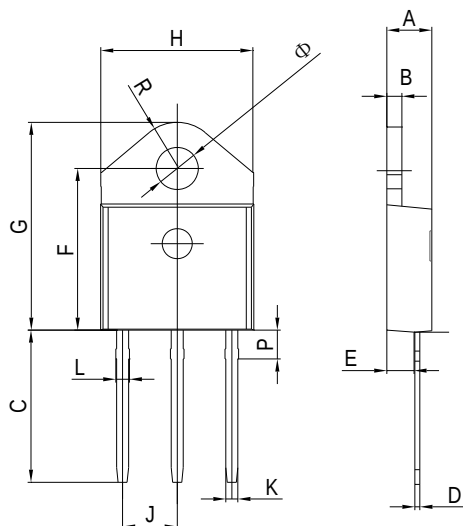


**FIG.9: On-state characteristics(Max)**



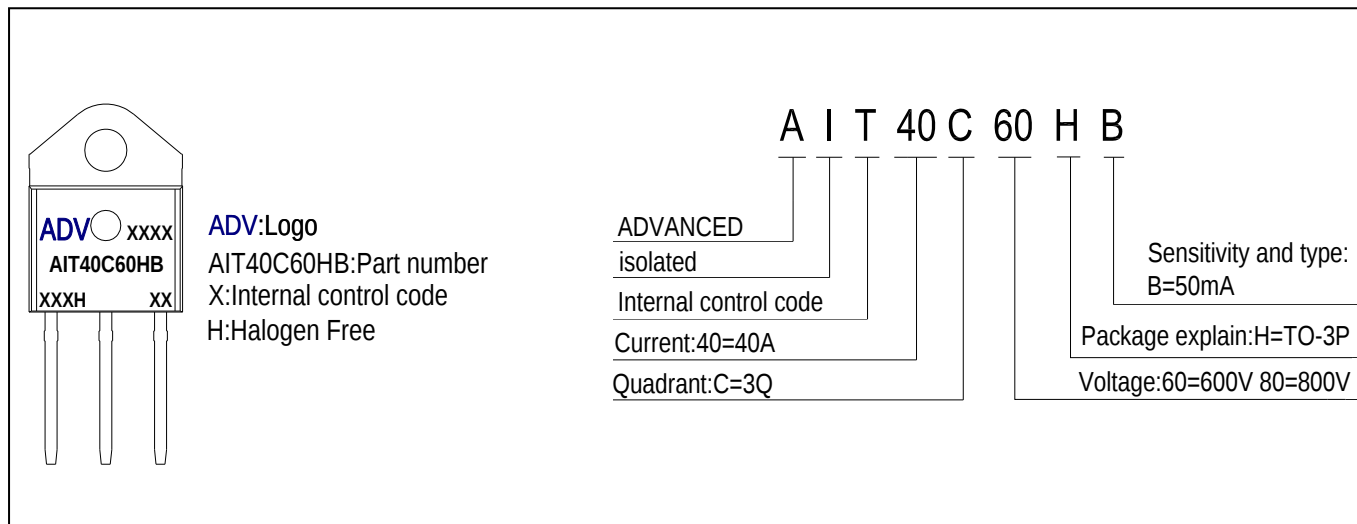
### PACKAGE MECHANICAL DATA

#### TO-3P(isolated) Package Dimension



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 4.4                       | 4.6   | 0.173                | 0.181 |
| B      | 1.45                      | 1.55  | 0.057                | 0.061 |
| C      | 14.35                     | 15.60 | 0.565                | 0.614 |
| D      | 0.5                       | 0.7   | 0.020                | 0.028 |
| E      | 2.7                       | 2.9   | 0.106                | 0.114 |
| F      | 15.8                      | 16.5  | 0.622                | 0.650 |
| G      | 20.4                      | 21.1  | 0.815                | 0.831 |
| H      | 15.1                      | 15.5  | 0.594                | 0.610 |
| J      | 5.4                       | 5.65  | 0.213                | 0.222 |
| K      | 1.2                       | 1.4   | 0.047                | 0.055 |
| Ø      | 4.08                      | 4.20  | 0.161                | 0.165 |
| L      | 1.35                      | 1.50  | 0.053                | 0.059 |
| P      | 2.8                       | 3.0   | 0.110                | 0.118 |
| R      | 4.60 typ.                 |       | 0.181 typ.           |       |

### Making Diagram



### Ordering information

| Part number | Package        | Marking    | Packing | Quantity |
|-------------|----------------|------------|---------|----------|
| AIT40C60HB  | TO-3P isolated | AIT40C60HB | Tube    | 30pcs    |
| AIT40C80HB  | TO-3P isolated | AIT40C80HB | Tube    | 30pcs    |

Note: B = Gate Trigger Current Sensitivity and type

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