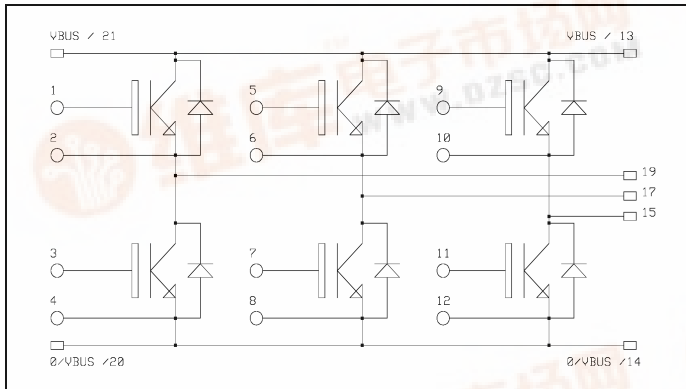




# APTGS75X170E3

## 3 Phase bridge NPT IGBT Power Module

$V_{CES} = 1700V$   
 $I_C = 75A @ T_c = 80^\circ C$



### Application

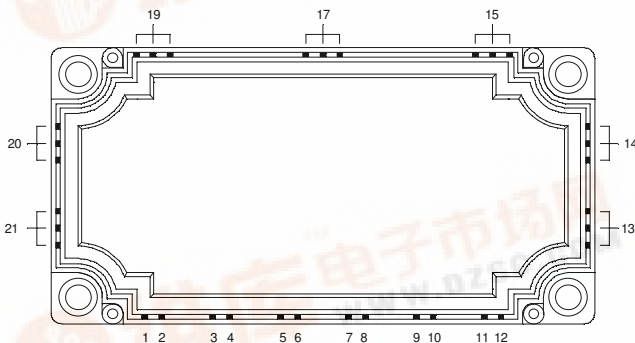
- AC Motor control

### Features

- Non Punch Through (NPT) Low Loss IGBT®
  - Low voltage drop
  - Low tail current
  - Switching frequency up to 20 kHz
  - Soft recovery parallel diodes
  - Low diode VF
  - Low leakage current
  - Avalanche energy rated
  - RBSOA and SCSOA rated
- Kelvin emitter for easy drive
- Very low stray inductance
- High level of integration

### Benefits

- Stable temperature behavior
- Very rugged
- Solderable terminals for easy PCB mounting
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive TC of VCEsat
- Low profile



### Absolute maximum ratings

| Symbol    | Parameter                             | Max ratings         | Unit       |
|-----------|---------------------------------------|---------------------|------------|
| $V_{CES}$ | Collector - Emitter Breakdown Voltage | 1700                | V          |
| $I_C$     | Continuous Collector Current          | $T_c = 25^\circ C$  | A          |
|           |                                       | $T_c = 80^\circ C$  |            |
| $I_{CM}$  | Pulsed Collector Current              | $T_c = 25^\circ C$  | 250        |
| $V_{GE}$  | Gate - Emitter Voltage                | $\pm 20$            | V          |
| $P_D$     | Maximum Power Dissipation             | $T_c = 25^\circ C$  | 625        |
| RBSOA     | Reverse Bias Operating Area           | $T_j = 125^\circ C$ | 150A@1600V |

**CAUTION:** These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

## Electrical Characteristics

All ratings @  $T_j = 25^\circ\text{C}$  unless otherwise specified

| Symbol       | Characteristic                        | Test Conditions                   | Min                                                   | Typ        | Max  | Unit |
|--------------|---------------------------------------|-----------------------------------|-------------------------------------------------------|------------|------|------|
| $BV_{CES}$   | Collector - Emitter Breakdown Voltage | $V_{GE} = 0V, I_C = 1mA$          | 1700                                                  |            |      | V    |
| $I_{CES}$    | Zero Gate Voltage Collector Current   | $V_{GE} = 0V$<br>$V_{CE} = 1700V$ | $T_j = 25^\circ\text{C}$<br>$T_j = 125^\circ\text{C}$ | 0.03<br>2  | 0.15 | mA   |
| $V_{CE(on)}$ | Collector Emitter on Voltage          | $V_{GE} = 15V$<br>$I_C = 75A$     | $T_j = 25^\circ\text{C}$<br>$T_j = 125^\circ\text{C}$ | 2.7<br>3.2 | 3.3  | V    |
| $V_{GE(th)}$ | Gate Threshold Voltage                | $V_{GE} = V_{CE}, I_C = 3.5mA$    | 4.5                                                   |            | 6.5  | V    |
| $I_{GES}$    | Gate – Emitter Leakage Current        | $V_{GE} = 20V, V_{CE} = 0V$       |                                                       |            | 100  | nA   |

## Dynamic Characteristics

| Symbol       | Characteristic      | Test Conditions                                                                                                          | Min | Typ  | Max | Unit |
|--------------|---------------------|--------------------------------------------------------------------------------------------------------------------------|-----|------|-----|------|
| $C_{ies}$    | Input Capacitance   | $V_{GE} = 0V, V_{CE} = 25V$<br>$f = 1MHz$                                                                                |     | 5000 |     | pF   |
| $T_{d(on)}$  | Turn-on Delay Time  | Inductive Switching ( $25^\circ\text{C}$ )<br>$V_{GE} = \pm 15V$<br>$V_{Bus} = 900V$<br>$I_C = 75A$<br>$R_G = 20\Omega$  |     | 100  |     | ns   |
| $T_r$        | Rise Time           |                                                                                                                          |     | 100  |     |      |
| $T_{d(off)}$ | Turn-off Delay Time |                                                                                                                          |     | 800  |     |      |
| $T_f$        | Fall Time           |                                                                                                                          |     | 30   |     |      |
| $T_{d(on)}$  | Turn-on Delay Time  | Inductive Switching ( $125^\circ\text{C}$ )<br>$V_{GE} = \pm 15V$<br>$V_{Bus} = 900V$<br>$I_C = 75A$<br>$R_G = 20\Omega$ |     | 100  |     | ns   |
| $T_r$        | Rise Time           |                                                                                                                          |     | 100  |     |      |
| $T_{d(off)}$ | Turn-off Delay Time |                                                                                                                          |     | 900  |     |      |
| $T_f$        | Fall Time           |                                                                                                                          |     | 30   |     |      |
| $E_{off}$    | Turn off Energy     |                                                                                                                          |     | 22   |     | mJ   |

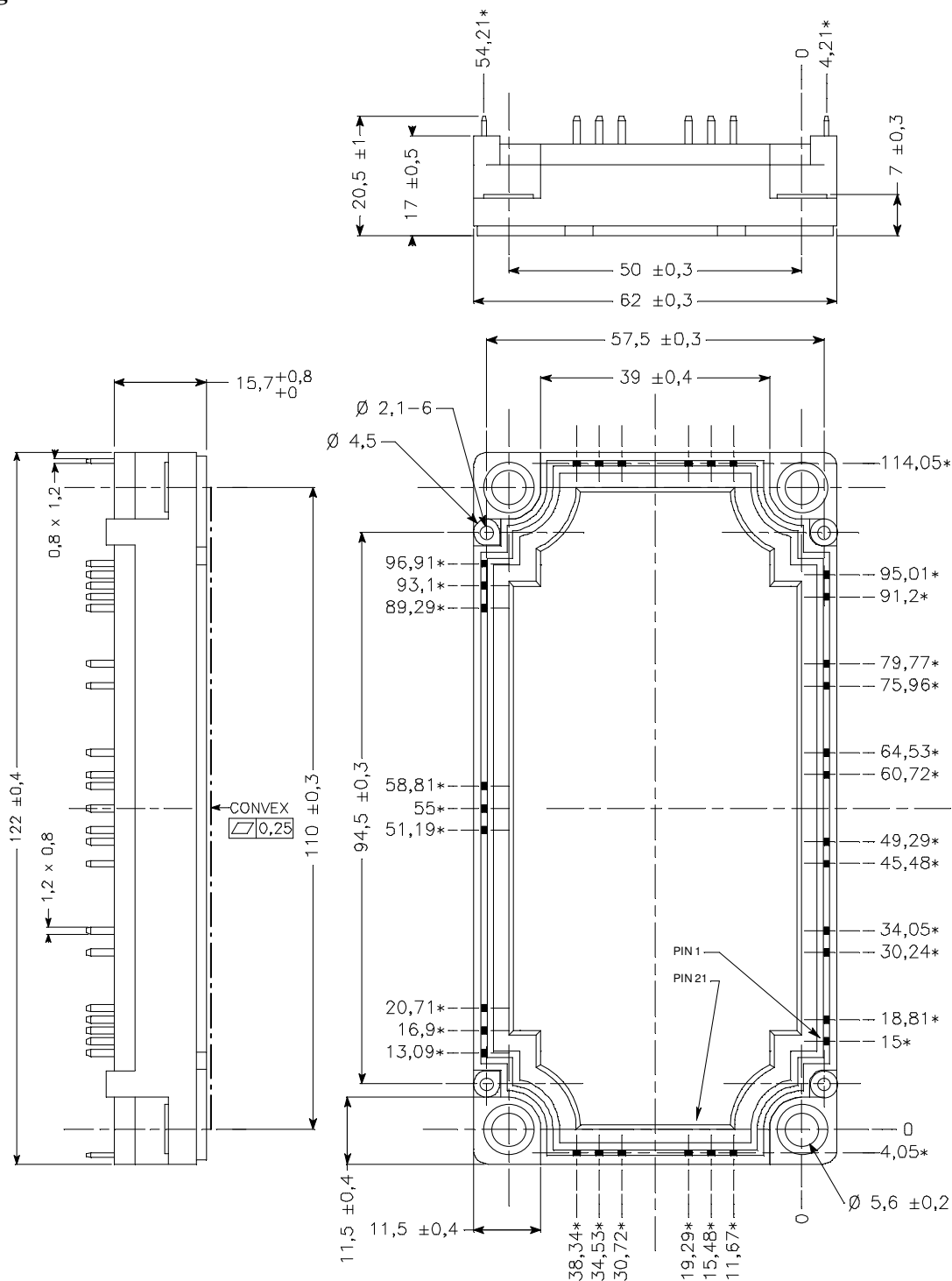
## Reverse diode ratings and characteristics

| Symbol   | Characteristic          | Test Conditions                                     | Min                                                   | Typ        | Max | Unit    |
|----------|-------------------------|-----------------------------------------------------|-------------------------------------------------------|------------|-----|---------|
| $V_F$    | Diode Forward Voltage   | $I_F = 75A$<br>$V_{GE} = 0V$                        | $T_j = 25^\circ\text{C}$<br>$T_j = 125^\circ\text{C}$ | 2.2<br>2.0 | 2.6 | V       |
| $E_r$    | Reverse Recovery Energy | $I_F = 75A$<br>$V_R = 900V$<br>$di/dt = 900A/\mu s$ | $T_j = 25^\circ\text{C}$<br>$T_j = 125^\circ\text{C}$ | 3.5<br>6.5 |     | mJ      |
| $Q_{rr}$ | Reverse Recovery Charge | $I_F = 75A$<br>$V_R = 900V$<br>$di/dt = 900A/\mu s$ | $T_j = 25^\circ\text{C}$<br>$T_j = 125^\circ\text{C}$ | 9<br>19    |     | $\mu C$ |

## Thermal and package characteristics

| Symbol            | Characteristic                                                            |             |    | Min   | Typ | Max  | Unit |
|-------------------|---------------------------------------------------------------------------|-------------|----|-------|-----|------|------|
| R <sub>thJC</sub> | Junction to Case                                                          |             |    | IGBT  |     | 0.2  | °C/W |
|                   |                                                                           |             |    | Diode |     | 0.47 |      |
| V <sub>ISOL</sub> | RMS Isolation Voltage, any terminal to case t =1 min, I isol<1mA, 50/60Hz |             |    | 2500  |     |      | V    |
| T <sub>J</sub>    | Operating junction temperature range                                      |             |    | -40   |     | 150  | °C   |
| T <sub>STG</sub>  | Storage Temperature Range                                                 |             |    | -40   |     | 125  |      |
| T <sub>C</sub>    | Operating Case Temperature                                                |             |    | -40   |     | 125  |      |
| Torque            | Mounting torque                                                           | To Heatsink | M5 | 3     |     | 4.5  | N.m  |
| Wt                | Package Weight                                                            |             |    |       |     | 300  | g    |

## Package outline



ALL DIMENSIONS MARKED \* \* \* ARE TOLERENCED AS :  $\varnothing 0,4$

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