



# PT85QWx45

## Pulse Power Thyristor Switch

### Preliminary Information

DS5334-1.2 April 2000

#### APPLICATIONS

- Pulse Power
- Crowbars
- Ignitron Replacement

#### FEATURES

- Double Side Cooling
- Fast Turn-on
- Low Turn-on Losses

#### VOLTAGE RATINGS

| Type Number | Repetitive Peak Voltages<br>$V_{DRM}/V_{RRM}$<br>V | Conditions   |
|-------------|--|--|
| PT85QWx45   | 4500/16  | $T_{vj} = 0^\circ \text{ to } 125^\circ\text{C}$ ,<br>$I_{DRM} = I_{RRM} = 50\text{mA}$ ,<br>$V_{DRM}, V_{RRM}, t_p = 10\text{ms}$ |

Lower voltage grades available.

#### KEY PARAMETERS

|             |                       |
|-------------|-----------------------|
| $V_{DRM}$   | 4500V                 |
| $I_{T(AV)}$ | 1670A                 |
| $I_{TSM}$   | 37000A                |
| $di/dt$     | 22000A/ $\mu\text{s}$ |

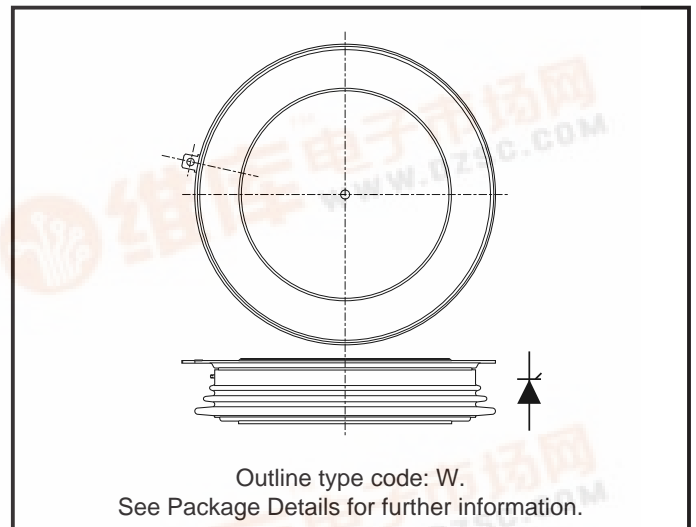


Fig.1 Package outline

#### CURRENT RATINGS

| Symbol                    | Parameter             | Conditions  | Max. | Units |
|---------------------------|-----------------------|---|------|-------|
| <b>Double Side Cooled</b> |                       |   |      |       |
| $I_{T(AV)}$               | Mean on-state current | Half wave resistive load, $T_{case} = 80^\circ\text{C}$ | 1670 | A     |
| $I_{T(RMS)}$              | RMS value             | $T_{case} = 80^\circ\text{C}$                           | 2625 | A     |

PT85QWx45

SURGE RATINGS

| Symbol    | Parameter                               | Conditions   | Max.               | Units            |
|-----------|---|--|--------------------|------------------|
| $I_{TSM}$ | Surge (non-repetitive) on-state current | 10ms half sine; $T_{case} = 125^{\circ}C$<br>$V_R = 50\% V_{RRM} - 1/4$ sine | 29.6               | kA               |
| $I^2t$    | $I^2t$ for fusing                       |  | $4.38 \times 10^6$ | A <sup>2</sup> s |
| $I_{TSM}$ | Surge (non-repetitive) on-state current | 10ms half sine; $T_{case} = 125^{\circ}C$<br>$V_R = 0$                       | 37.0               | kA               |
| $I^2t$    | $I^2t$ for fusing                       |  | $6.85 \times 10^6$ | A <sup>2</sup> s |

THERMAL AND MECHANICAL DATA

| Symbol        | Parameter                             | Conditions                                 |             | Min. | Max.  | Units |
|---------------|---------------------------------------|--|-------------|------|-------|-------|
| $R_{th(j-c)}$ | Thermal resistance - junction to case | Double side cooled                         | dc          | -    | 0.01  | °C/W  |
| $R_{th(c-h)}$ | Thermal resistance - case to heatsink | Clamping force 40kN with mounting compound | Double side | -    | 0.001 | °C/W  |
| $T_{vj}$      | Virtual junction temperature          | On-state (conducting)                      |             | -    | 135   | °C    |
|               |                                       | Reverse (blocking)                         |             | -    | 125   | °C    |
| $T_{stg}$     | Storage temperature range             |  |             | -55  | 125   | °C    |
| -             | Clamping force                        |  |             | 36.0 | 44.0  | kN    |

DYNAMIC CHARACTERISTICS

| Symbol                             | Parameter  | Conditions   |                | Typ. | Max.  | Units |
|------------------------------------|--|--|----------------|------|-------|-------|
| I <sub>RRM</sub> /I <sub>DRM</sub> | Peak reverse and off-state current               | At V <sub>RRM</sub> /V <sub>DRM</sub> , T <sub>case</sub> = 125°C                                      |                | -    | 250   | mA    |
| dV/dt                              | Maximum linear rate of rise of off-state voltage | To 67% V <sub>DRM</sub> T <sub>j</sub> = 125°C. R <sub>gk</sub> ≤ 1.5Ω                                 |                | -    | 200   | V/μs  |
| di/dt                              | Rate of rise of on-state current                 | From 67% V <sub>DRM</sub> to 90kA<br>Gate source 130A<br>t <sub>r</sub> = 1.5μs, T <sub>j</sub> = 25°C | Non-repetitive | -    | 22000 | A/μs  |
| V <sub>T(TO)</sub>                 | Threshold voltage                                | At T <sub>vj</sub> = 125°C   |                | -    | 1.45  | V     |
| r <sub>T</sub>                     | On-state slope resistance                        | At T <sub>vj</sub> = 125°C   |                | -    | 0.3   | mΩ    |

GATE TRIGGER CHARACTERISTICS AND RATINGS

| Symbol   | Parameter            | Conditions                                | Typ. | Max. | Units |
|----------|----------------------|---|------|------|-------|
| $V_{GT}$ | Gate trigger voltage | $V_{DRM} = 5V$ , $T_{case} = 25^{\circ}C$ | 1.0  | 4.0  | V     |
| $I_{GT}$ | Gate trigger current | $V_{DRM} = 5V$ , $T_{case} = 25^{\circ}C$ | -    | 1.5  | A     |

ORDERING INFORMATION

PT Pulse Power Thyristor  
85Q Device type  
W Package outline type code  
x lead length (see table, right)  
45 Voltage x100

| Lead length (x) |         |        |
|-----------------|---------|--------|
| O               | No lead |        |
| C               | 8"      | 200mm  |
| D               | 10"     | 250mm  |
| E               | 12"     | 300mm  |
| F               | 16"     | 400mm  |
| G               | 18"     | 450mm  |
| H               | 20"     | 500mm  |
| J               | 24"     | 600mm  |
| K               | 30"     | 750mm  |
| L               | 40"     | 1000mm |

CURVES

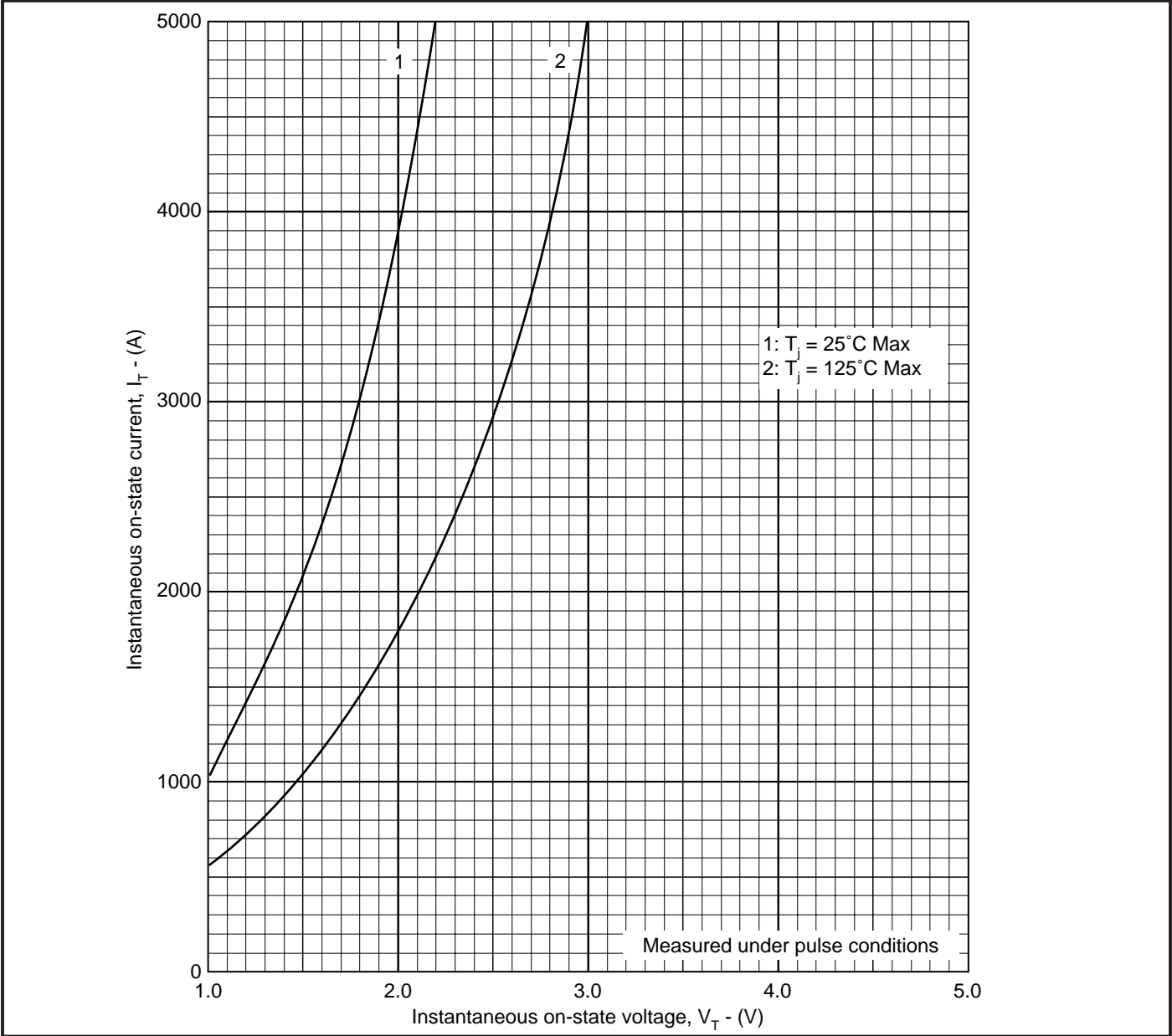


Fig.2 Maximum (limit) on-state characteristics

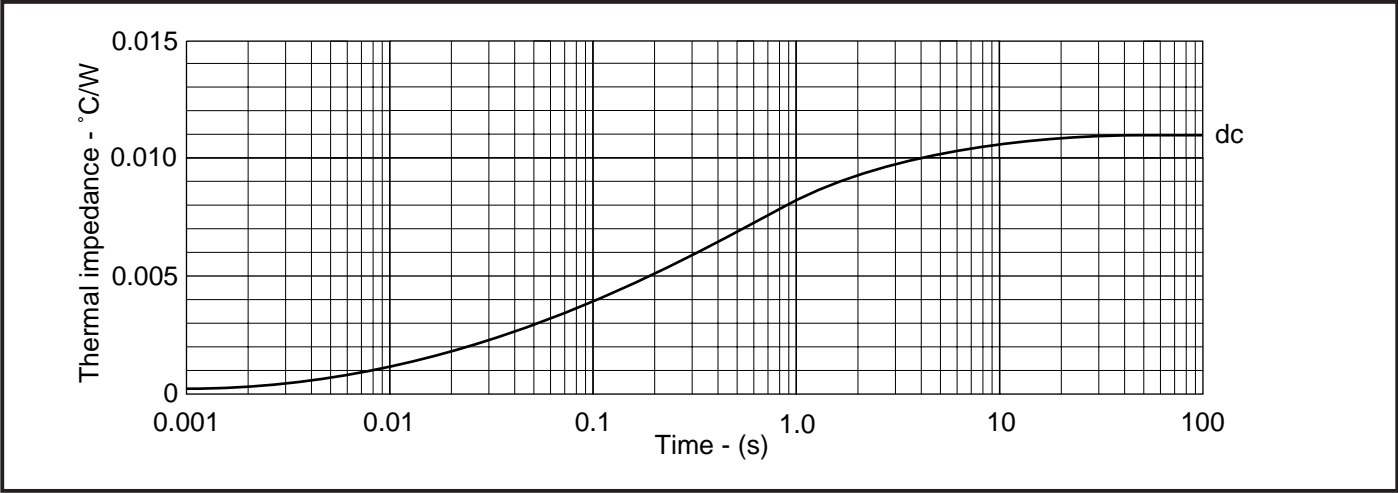
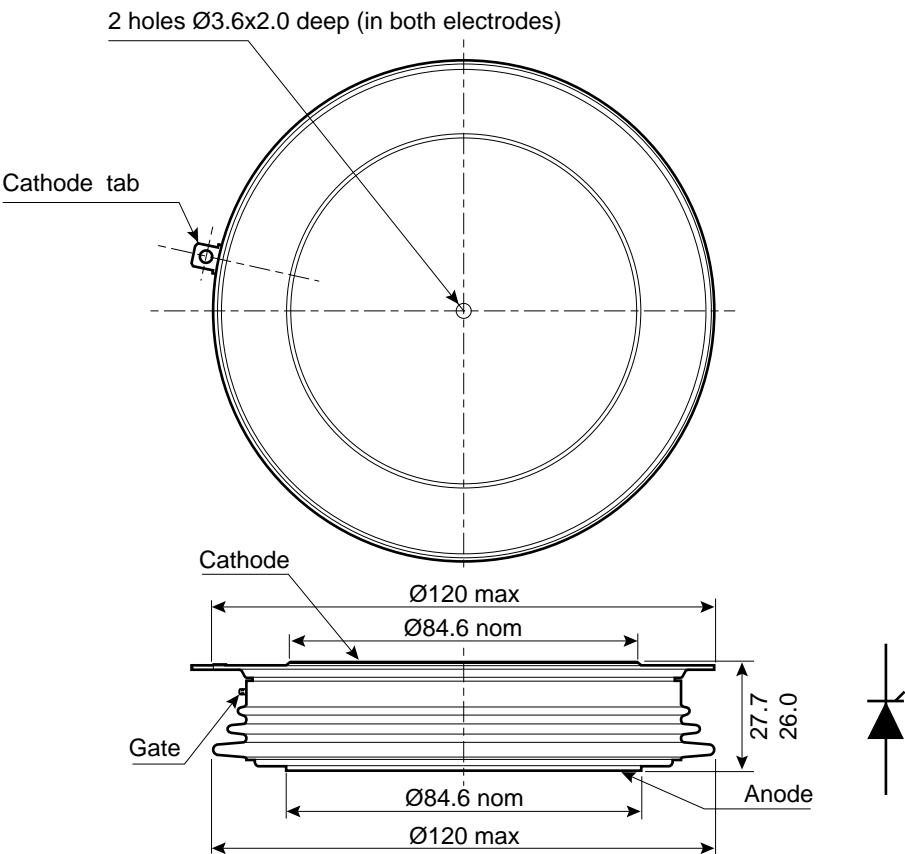


Fig.3 Maximum (limit) transient thermal impedance - junction to case

**PACKAGE DETAILS**

For further package information, please contact your local Customer Service Centre. All dimensions in mm, unless stated otherwise.  
DO NOT SCALE.



Nominal weight: 2600g  
Clamping force: 40kN  $\pm$ 10%

**Package outline type code: W**

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The Power Assembly group was set up to provide a support service for those customers requiring more than the basic semiconductor, and has developed a flexible range of heatsink and clamping systems in line with advances in device voltages and current capability of our semiconductors.

We offer an extensive range of air and liquid cooled assemblies covering the full range of circuit designs in general use today. The Assembly group offers high quality engineering support dedicated to designing new units to satisfy the growing needs of our customers.

Using the latest CAD methods our team of design and applications engineers aim to provide the Power Assembly Complete Solution (PACs).

## HEATSINKS

The Power Assembly group has its own proprietary range of extruded aluminium heatsinks which have been designed to optimise the performance of Dynex semiconductors. Data with respect to air natural, forced air and liquid cooling (with flow rates) is available on request.

For further information on device clamps, heatsinks and assemblies, please contact your nearest sales representative or Customer Services.



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**Preliminary Information:** The product is in design and development. The datasheet represents the product as it is understood but details may change.

**Advance Information:** The product design is complete and final characterisation for volume production is well in hand.

**No Annotation:** The product parameters are fixed and the product is available to datasheet specification.

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