


PASSIVATED ASSEMBLED CIRCUIT ELEMENTS

Features

- Glass passivated junctions for greater reliability
- Electrically isolated base plate
- Available up to 1200 V_{RRM}, V_{DRM}
- High dynamic characteristics
- Wide choice of circuit configurations
- Simplified mechanical design and assembly
- UL E78996 approved 

25A

Description

The P100 series of Integrated Power Circuits consists of power thyristors and power diodes configured in a single package. With its isolating base plate, mechanical designs are greatly simplified giving advantages of cost reduction and reduced size.

Applications include power supplies, control circuits and battery chargers.

Major Ratings and Characteristics

| Parameters | P100 | Units |
|-------------------|-------------|-------------------|
| I _b | 25 | A |
| @ T _c | 85 | °C |
| I _{FSM} | 357 | A |
| @ 50Hz | | |
| @ 60Hz | 375 | A |
| I ² t | 637 | A ² s |
| @ 50Hz | | |
| @ 60Hz | 580 | A ² s |
| I ² √t | 6365 | A ² √s |
| V _{RRM} | 400 to 1200 | V |
| V _{INS} | 2500 | V |
| T _J | - 40 to 125 | °C |

P100 Series

Bulletin I27125 rev. A 04/99

International
 Rectifier

ELECTRICAL SPECIFICATIONS

Voltage Ratings

| Type number | V_{RRM} maximum repetitive peak reverse voltage V | V_{RSM} maximum non-repetitive peak reverse voltage V | V_{DRM} maximum repetitive peak off-state voltage V | I_{RRM} max. @ T_J max. mA |
|------------------|--|--|--|-----------------------------------|
| P101, P121, P131 | 400 | 500 | 400 | 10 |
| P102, P122, P132 | 600 | 700 | 600 | |
| P103, P123, P133 | 800 | 900 | 800 | |
| P104, P124, P134 | 1000 | 1100 | 1000 | |
| P105, P125, P135 | 1200 | 1300 | 1200 | |

On-state Conduction

| Parameter | P100 | Units | Conditions |
|---|------|---------------|---|
| I_D Maximum DC output current | 25 | A | @ $T_C = 85^\circ\text{C}$, full bridge |
| I_{TSM} Max. peak one-cycle | 357 | A | t = 10ms No voltage |
| I_{FSM} non-repetitive on-state or forward current | 375 | | t = 8.3ms reappplied |
| | 300 | | t = 10ms 100% V_{RRM} |
| | 315 | | t = 8.3ms reappplied |
| I^2t Maximum I^2t for fusing | 637 | A^2s | t = 10ms No voltage |
| | 580 | | t = 8.3ms reappplied |
| | 450 | | t = 10ms 100% V_{RRM} |
| | 410 | | t = 8.3ms reappplied |
| $I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing | 6365 | $A^2\sqrt{s}$ | t = 0.1 to 10ms, no voltage reappplied I^2t for time tx = $I^2\sqrt{t} \cdot \sqrt{tx}$ |
| $V_{T(TO)}$ Max. value of threshold voltage | 0.82 | V | $T_J = 125^\circ\text{C}$ |
| r_{t1} Max. level value of on-state slope resistance | 12 | $m\Omega$ | $T_J = 125^\circ\text{C}$, Av. power = $V_{T(TO)} \cdot I_{T(AV)} + r_t + (I_{T(RMS)})^2$ |
| V_{TM} Max. peak on-state or V_{FM} forward voltage drop | 1.35 | V | $T_J = 25^\circ\text{C}$, $I_{TM} = \pi \times I_{T(AV)}$ |
| di/dt Maximum non repetitive rate of rise of turned on current | 200 | A/ μs | $T_J = 125^\circ\text{C}$ from 0.67 V_{DRM} $I_{TM} = \pi \times I_{T(AV)}$, $I_g = 500\text{mA}$, $tr < 0.5\mu s$, $tp > 6\mu s$ |
| I_H Maximum holding current | 130 | mA | $T_J = 25^\circ\text{C}$ anode supply = 6V, resistive load, gate open |
| I_L Maximum latching current | 250 | mA | $T_J = 25^\circ\text{C}$ anode supply = 6V, resistive load |

Blocking

| Parameter | P100 | Units | Conditions |
|--|------|------------|---|
| dv/dt Maximum critical rate of rise of off-state voltage | 200 | V/ μ s | $T_J = 125^\circ\text{C}$, exponential to $0.67 V_{\text{DRM}}$ gate open |
| I_{RRM} Max. peak reverse and off-state leakage current at $V_{\text{RRM}}, V_{\text{DRM}}$ | 10 | mA | $T_J = 125^\circ\text{C}$, gate open circuit |
| I_{RRM} Max peak reverse leakage current | 100 | μ A | $T_J = 25^\circ\text{C}$ |
| V_{INS} RMS isolation voltage | 2500 | V | 50Hz, circuit to base, all terminal shorted, $T_J = 25^\circ\text{C}$, $t = 1\text{s}$ |

Triggering

| Parameter | P100 | Units | Conditions | |
|--|------|-------|--|---------------------------|
| P_{GM} Maximum peak gate power | 8 | W | | |
| $P_{\text{G(AV)}}$ Maximum average gate power | 2 | | | |
| I_{GM} Maximum peak gate current | 2 | A | | |
| $-V_{\text{GM}}$ Maximum peak negative gate voltage | 10 | V | Anode Supply = 6V resistive load | |
| V_{GT} Maximum gate voltage required to trigger | 3 | | | $T_J = -40^\circ\text{C}$ |
| | 2 | | | $T_J = 25^\circ\text{C}$ |
| | 1 | | $T_J = 125^\circ\text{C}$ | |
| I_{GD} Maximum gate current required to trigger | 90 | mA | Anode Supply = 6V resistive load | |
| | 60 | | | $T_J = -40^\circ\text{C}$ |
| | 35 | | | $T_J = 25^\circ\text{C}$ |
| V_{GD} Maximum gate voltage that will not trigger | 0.2 | V | $T_J = 125^\circ\text{C}$, rated V_{DRM} applied | |
| I_{GD} Maximum gate current that will not trigger | 2 | mA | $T_J = 125^\circ\text{C}$, rated V_{DRM} applied | |

Thermal and Mechanical Specification

| Parameter | P100 | Units | Conditions |
|---|------------|------------------|---|
| T_J Max. operating temperature range | -40 to 125 | $^\circ\text{C}$ | |
| T_{stg} Max. storage temperature range | -40 to 125 | | |
| R_{thJC} Max. thermal resistance, junction to case | 2.24 | K/W | DC operation per junction |
| R_{thCS} Max. thermal resistance, case to heatsink | 0.10 | K/W | Mounting surface, smooth and greased |
| T Mounting torque, base to heatsink | 4 | Nm | A mounting compound is recommended and the torque should be checked after a period of 3 hours to allow for the spread of the compound |
| wt Approximate weight | 58 (2.0) | g (oz) | |

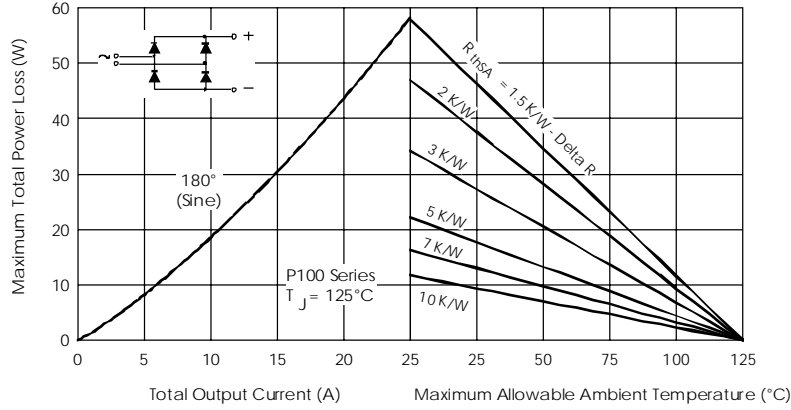


Fig. 1 - Current Ratings Nomogram (1 Module Per Heatsink)

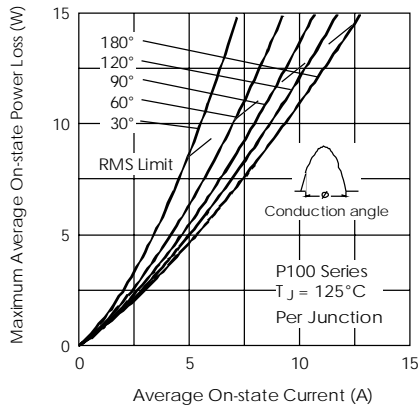


Fig. 2 - On-state Power Loss Characteristics

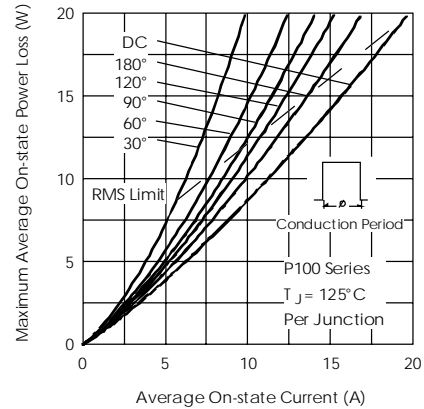


Fig. 3 - On-state Power Loss Characteristics

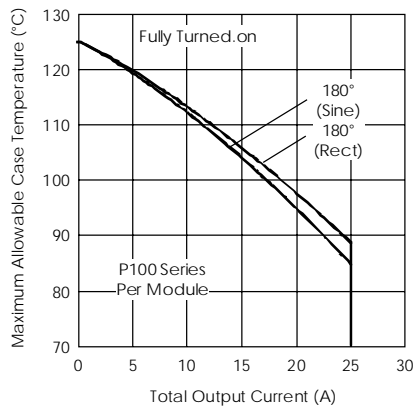


Fig. 4 - Current Ratings Characteristics

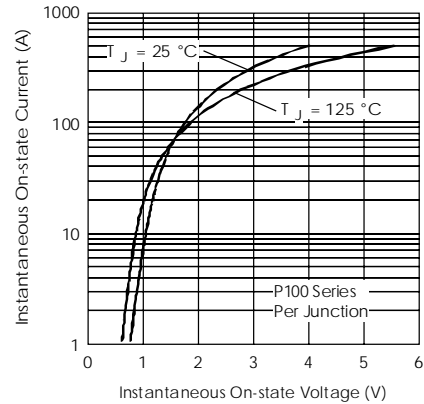


Fig. 5 - On-state Voltage Drop Characteristics

P100 Series

Bulletin I27125 rev. A 04/99

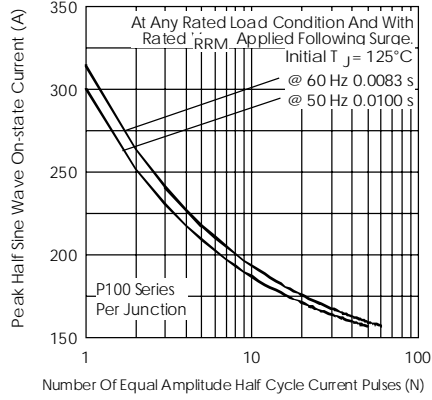


Fig. 6 - Maximum Non-Repetitive Surge Current

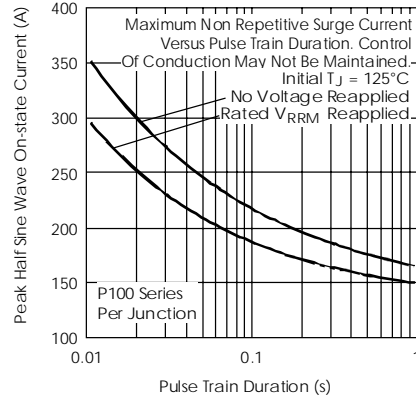


Fig. 7 - Maximum Non-Repetitive Surge Current

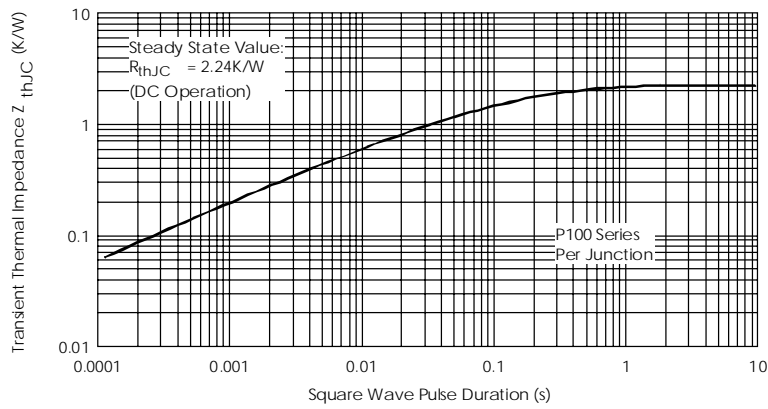


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

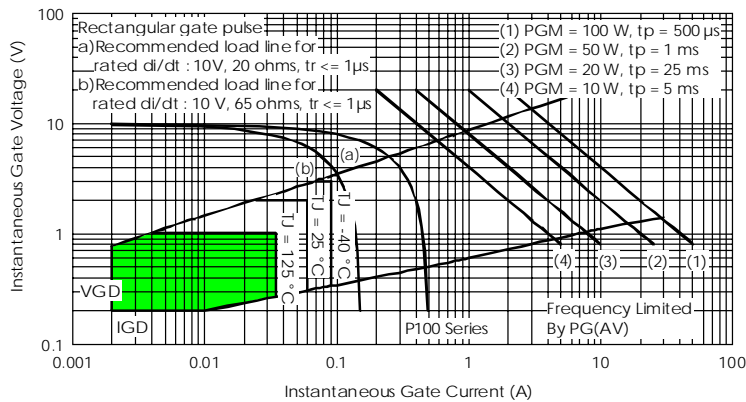


Fig. 9 - Gate Characteristics

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Data and specifications subject to change without notice.