

### THREE PHASE BRIDGE

### Power Module

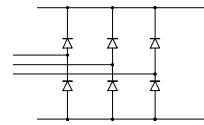
#### Features

- Low  $V_F$
- Low profile package
- Direct Mounting to heatsink
- Flat-Pin/ Round-Pin versions with PCB solderable terminals
- Low junction-to-case Thermal Resistance
- 3500 V<sub>RMS</sub> insulation voltage
- UL approval pending

#### Applications: Power conversion machines

- Welding
- UPS
- SMPS
- Motor Drives
- General Purpose & Heavy Duty Applications

45 A  
75 A  
100 A



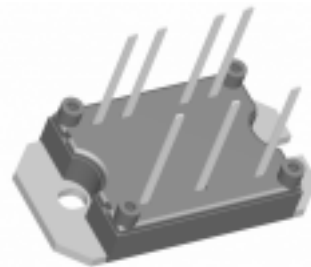
#### Description

A range of extremely compact three-phase rectifier bridges offering efficient and reliable operation.

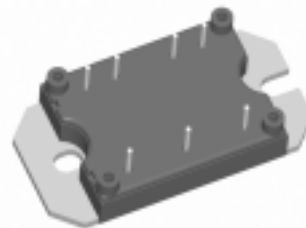
The low profile package has been specifically conceived to maximize space saving and optimize the electrical layout of the application specific Power Supplies.

#### Major Ratings and Characteristics

| Parameters              | 40MT        | 70MT | 100MT | Units             |
|-------------------------|-------------|------|-------|-------------------|
| I <sub>O</sub>          | 45          | 75   | 100   | A                 |
| @ T <sub>C</sub>        | 100         | 80   | 80    | °C                |
| I <sub>FSM</sub> @ 50Hz | 270         | 380  | 450   | A                 |
| @ 60Hz                  | 280         | 398  | 470   |                   |
| I <sup>2</sup> t @ 50Hz | 365         | 724  | 1013  | A <sup>2</sup> s  |
| @ 60Hz                  | 325         | 660  | 920   |                   |
| I <sup>2</sup> √t       | 3650        | 7240 | 10130 | A <sup>2</sup> √s |
| V <sub>RRM</sub>        | 1400 & 1600 |      |       | V                 |
| T <sub>STG</sub> range  | -40 to 125  |      |       | °C                |
| T <sub>J</sub> range    | -40 to 150  |      |       |                   |



MT...PA



MT...PB

**ELECTRICAL SPECIFICATIONS**

## Voltage Ratings

| Type number     | Voltage<br>Code<br>reverse voltage<br>V | $V_{RRM}$ , maximum<br>repetitive peak<br>reverse voltage<br>V | $V_{RSM}$ , maximum<br>non-repetitive peak<br>V | $I_{RRM}$ max.<br>@ $T_J = 150^\circ\text{C}$<br>mA |
|-----------------|-----------------------------------------|----------------------------------------------------------------|-------------------------------------------------|-----------------------------------------------------|
| 40-70-100MT140P | 140                                     | 1400                                                           | 1500                                            | 5                                                   |
| 40-70-100MT160P | 160                                     | 1600                                                           | 1700                                            |                                                     |

## Forward Conduction

| Parameter          |                                                                              | 40MT                          | 70MT                          | 100MT                          | Units             | Conditions                                                      |                                    |                                                     |  |
|--------------------|------------------------------------------------------------------------------|-------------------------------|-------------------------------|--------------------------------|-------------------|-----------------------------------------------------------------|------------------------------------|-----------------------------------------------------|--|
| I <sub>O</sub>     | Maximum DC output current<br>@ Case temperature                              | 45                            | 75                            | 100                            | A                 | 120° Rect conduction angle                                      |                                    |                                                     |  |
|                    |                                                                              | 100                           | 80                            | 80                             | °C                |                                                                 |                                    |                                                     |  |
| I <sub>FSM</sub>   | Maximum peak, one-cycle<br>forward, non-repetitive<br>on state surge current | 270                           | 380                           | 450                            | A                 | t = 10ms                                                        | No voltage<br>reapplied            | Initial<br><br>T <sub>J</sub> = T <sub>J</sub> max. |  |
|                    |                                                                              | 280                           | 398                           | 470                            |                   | t = 8.3ms                                                       |                                    |                                                     |  |
|                    |                                                                              | 225                           | 320                           | 380                            |                   | t = 10ms                                                        | 100% V <sub>RRM</sub><br>reapplied |                                                     |  |
|                    |                                                                              | 240                           | 335                           | 400                            |                   | t = 8.3ms                                                       |                                    |                                                     |  |
| I <sup>2</sup> t   | Maximum I <sup>2</sup> t for fusing                                          | 365                           | 724                           | 1013                           | A <sup>2</sup> s  | t = 10ms                                                        | No voltage<br>reapplied            |                                                     |  |
|                    |                                                                              | 325                           | 660                           | 920                            |                   | t = 8.3ms                                                       |                                    |                                                     |  |
|                    |                                                                              | 253                           | 512                           | 600                            |                   | t = 10ms                                                        | 100% V <sub>RRM</sub><br>reapplied |                                                     |  |
|                    |                                                                              | 240                           | 467                           | 665                            |                   | t = 8.3ms                                                       |                                    |                                                     |  |
| I <sup>2</sup> √t  | Maximum I <sup>2</sup> √t for fusing                                         | 3650                          | 7240                          | 10130                          | A <sup>2</sup> √s | t = 0.1 to 10ms, no voltage reapplied                           |                                    |                                                     |  |
| V <sub>F(TO)</sub> | Value of threshold voltage                                                   | 0.78                          | 0.82                          | 0.75                           | V                 | @ T <sub>J</sub> max.                                           |                                    |                                                     |  |
| r <sub>t</sub>     | Slope resistance                                                             | 14.8                          | 9.5                           | 8.1                            | mΩ                |                                                                 |                                    |                                                     |  |
| V <sub>FM</sub>    | Maximum forward voltage drop                                                 | 1.45<br>I <sub>pk</sub> = 40A | 1.45<br>I <sub>pk</sub> = 70A | 1.51<br>I <sub>pk</sub> = 100A | V                 | T <sub>J</sub> = 25°C<br>t <sub>p</sub> = 400μs single junction |                                    |                                                     |  |

## Insulation Table

| Parameter                        | 40MT | 70MT | 100MT | Units | Conditions                                                        |
|----------------------------------|------|------|-------|-------|-------------------------------------------------------------------|
| $V_{INS}$ RMS insulation voltage | 3500 |      |       | V     | $T_J = 25^\circ\text{C}$ all terminal shorted<br>f = 50Hz, t = 1s |

### Thermal and Mechanical Specifications

| Parameter                                               | 40MT        | 70MT | 100MT | Units | Conditions                                                                                                                               |
|---------------------------------------------------------|-------------|------|-------|-------|------------------------------------------------------------------------------------------------------------------------------------------|
| $T_J$ Maximum junction operating temperature range      | - 40 to 150 |      |       | °C    |                                                                                                                                          |
| $T_{stg}$ Maximum storage temperature range             | -40 to 125  |      |       | °C    |                                                                                                                                          |
| $R_{thJC}$ Maximum thermal resistance, junction to case | 0.27        | 0.23 | 0.19  | K/W   | DC operation per module                                                                                                                  |
|                                                         | 1.6         | 1.38 | 1.14  |       | DC operation per junction                                                                                                                |
|                                                         | 0.38        | 0.29 | 0.22  |       | 120° Rect conduction angle per module                                                                                                    |
|                                                         | 2.25        | 1.76 | 1.29  |       | 120° Rect conduction angle per junction                                                                                                  |
| $R_{thCS}$ Maximum thermal resistance, case to heatsink | 0.1         |      |       | K/W   | Per module.<br>Mounting surface smooth, flat and greased.<br>Heatsink compound thermal conductivity = 0.42W/mK                           |
| T Mounting torque $\pm 10\%$ to heatsink                | 4           |      |       | Nm    | A mounting compound is recommended and the torque should be rechecked after a period of 3 hours to allow for the spread of the compound. |
| wt Approximate weight                                   | 65          |      |       | g     | Lubricated threads.                                                                                                                      |

### Clearance and Creepage Distances

| Parameter                                                                                                                                                   | MT...PA | MT...PB | Units |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------|-------|
| Clearance (external shortest distance in air between terminals which are not internally short circuited together)                                           | 10.9    | 12.3    | mm    |
| Creepage distance (shortest distance along external surface of the insulating material between terminals which are not internally short circuited together) | 10.9    | 12.3    | mm    |

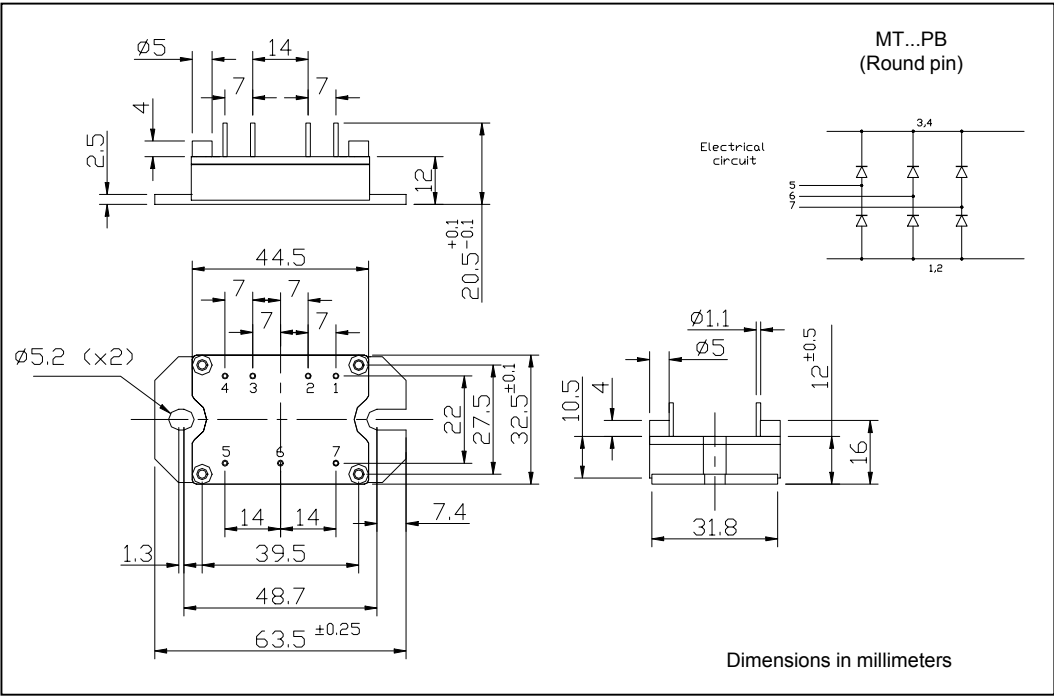
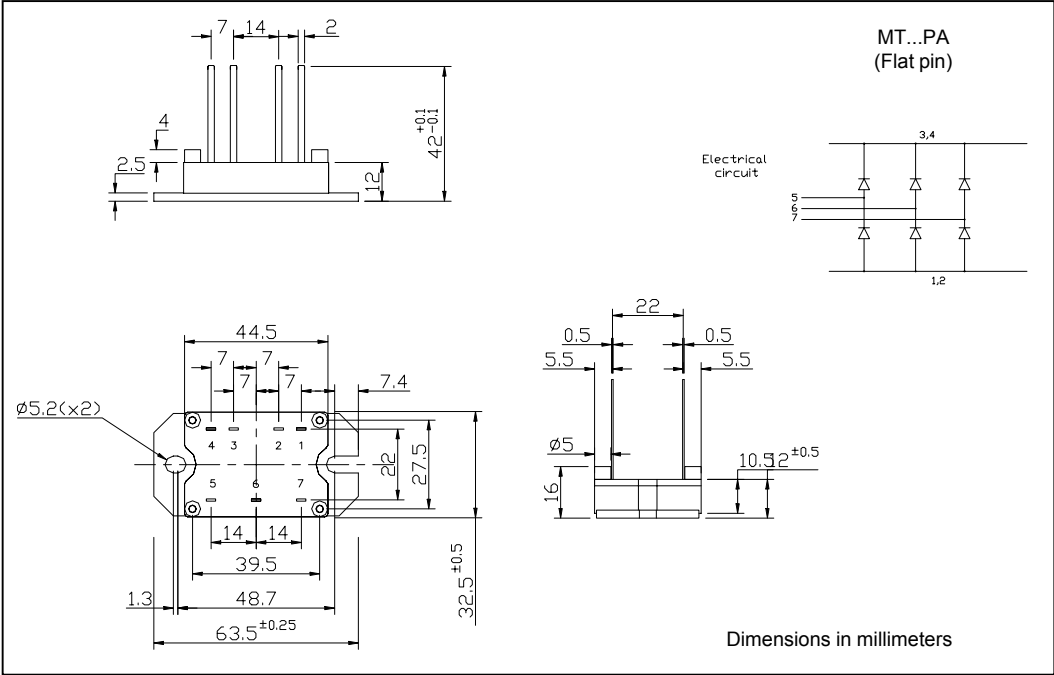
### Ordering Information Table

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |           |          |           |            |            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------|-----------|------------|------------|
| <b>Device Code</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |          |           |            |            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>10</b> | <b>0</b> | <b>MT</b> | <b>160</b> | <b>P B</b> |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ①         | ②        | ③         | ④          | ⑤          |
| <div> <div> <b>1</b> - Current rating code           <div>             4 = 45A<br/>             7 = 75A<br/>             10 = 100A           </div> </div> <div> <b>2</b> - Circuit configuration code: 0 = 3-Phase Rectifier Bridge           </div> <div> <b>3</b> - Essential part number           </div> <div> <b>4</b> - Voltage code: code x 10 = <math>V_{RRM}</math> (See Voltage Ratings table)           </div> <div> <b>5</b> - Pinout code:           <div>             A = Flat pins<br/>             B = Round pins           </div> </div> </div> |           |          |           |            |            |

**MTP 3-Phase Rectifier Series**

Bulletin I27145 rev. B 06/02

**Outline Table**



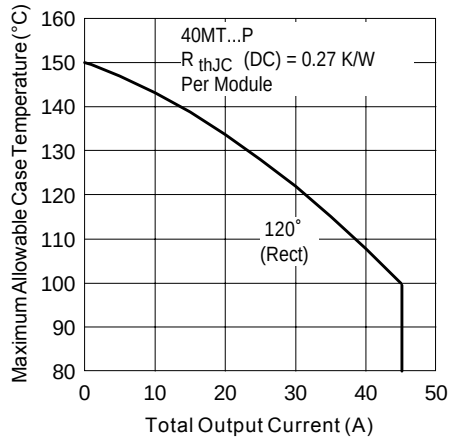


Fig. 1 - Current Rating Characteristics

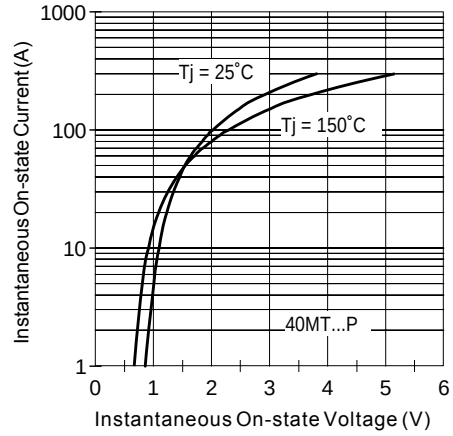


Fig. 2 - On-state Voltage Drop Characteristics

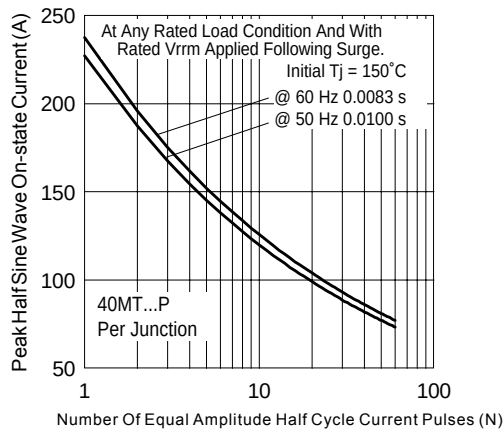


Fig. 3 - Maximum Non-Repetitive Surge Current

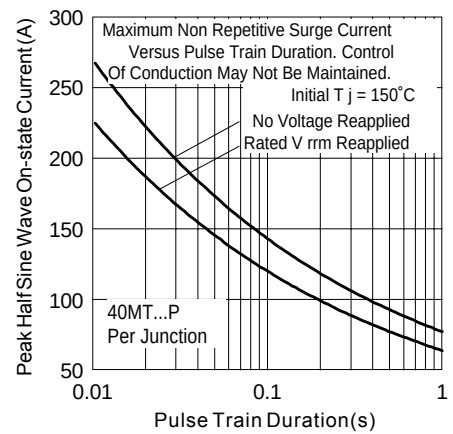


Fig. 4 - Maximum Non-Repetitive Surge Current

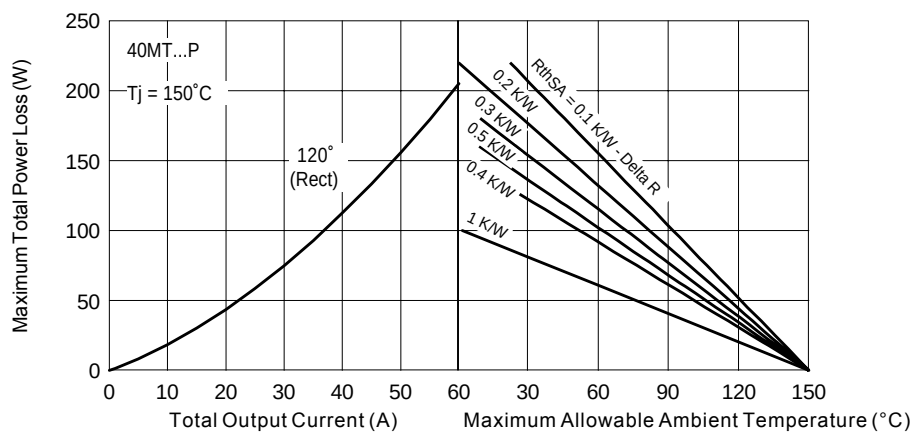


Fig. 5 - Current Rating Nomogram (1 Module Per Heatsink)

## MTP 3-Phase Rectifier Series

Bulletin I27145 rev. B 06/02

International  
**IOR** Rectifier

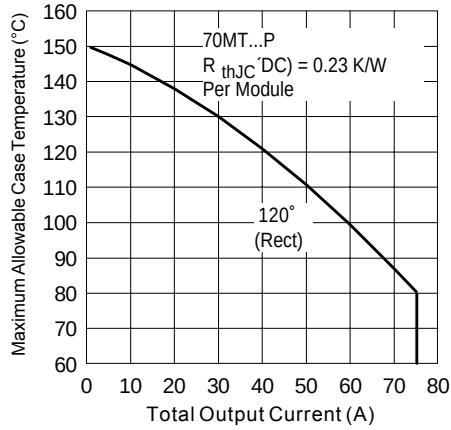


Fig. 6 - Current Rating Characteristics

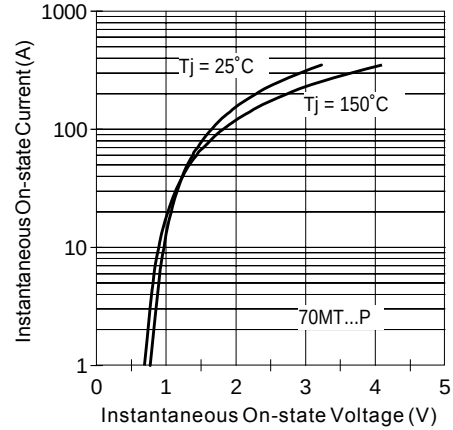


Fig. 7 - On-state Voltage Drop Characteristics

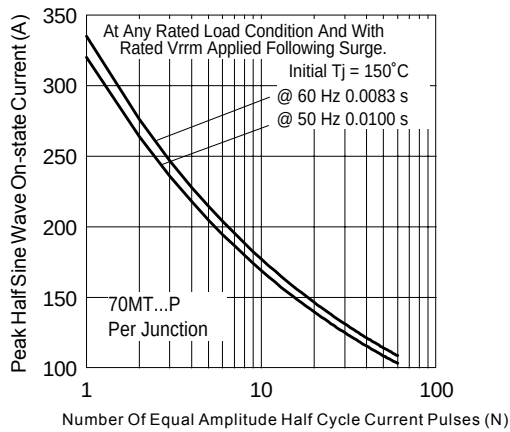


Fig. 8 - Maximum Non-Repetitive Surge Current

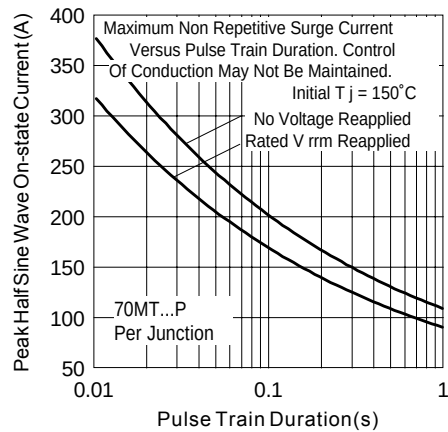


Fig. 9 - Maximum Non-Repetitive Surge Current

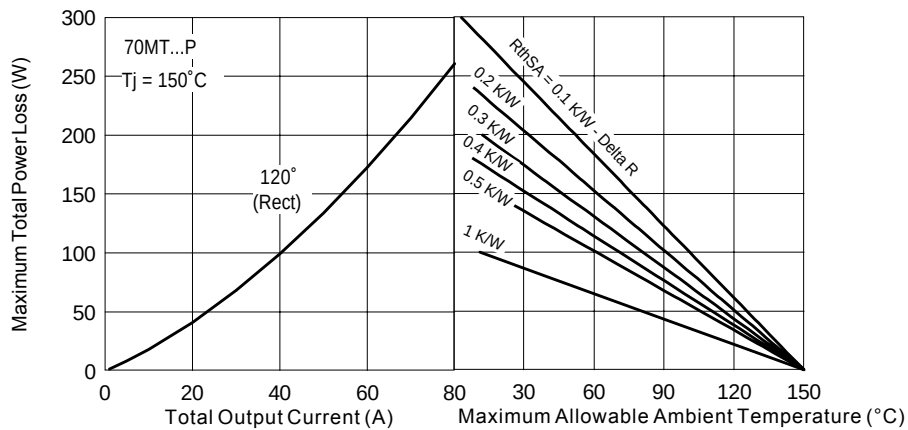


Fig. 10 - Current Rating Nomogram (1 Module Per Heatsink)

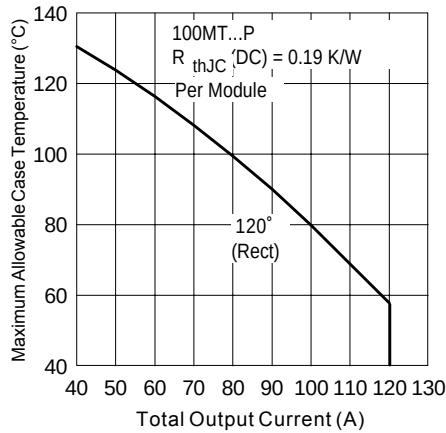


Fig. 11 - Current Rating Characteristics

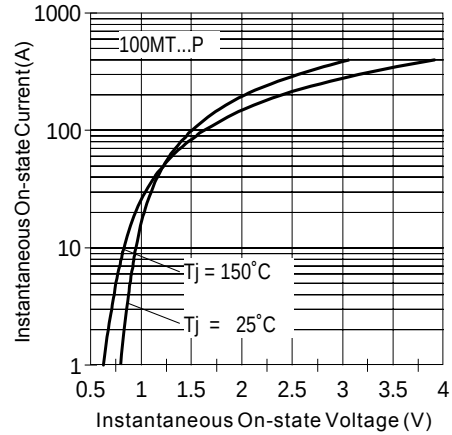


Fig. 12 - On-state Voltage Drop Characteristics

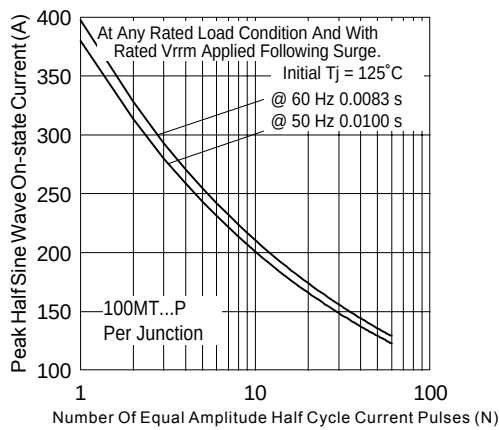


Fig. 13 - Maximum Non-Repetitive Surge Current

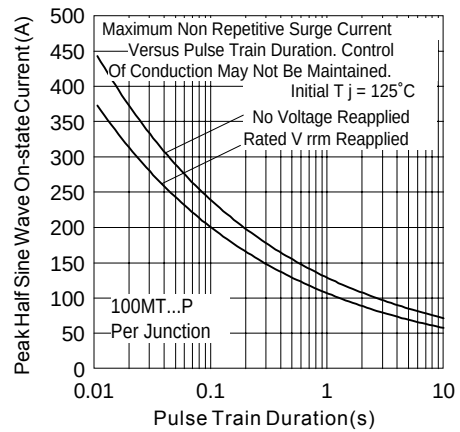


Fig. 14 - Maximum Non-Repetitive Surge Current

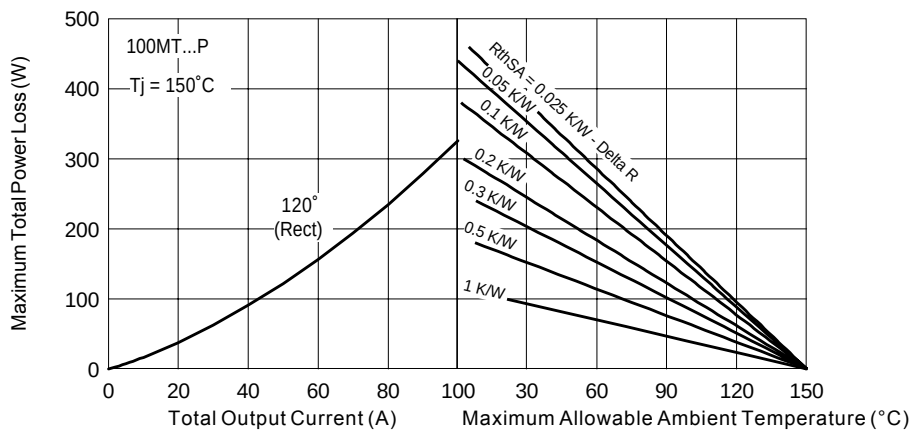


Fig. 15 - Current Rating Nomogram (1 Module Per Heatsink)

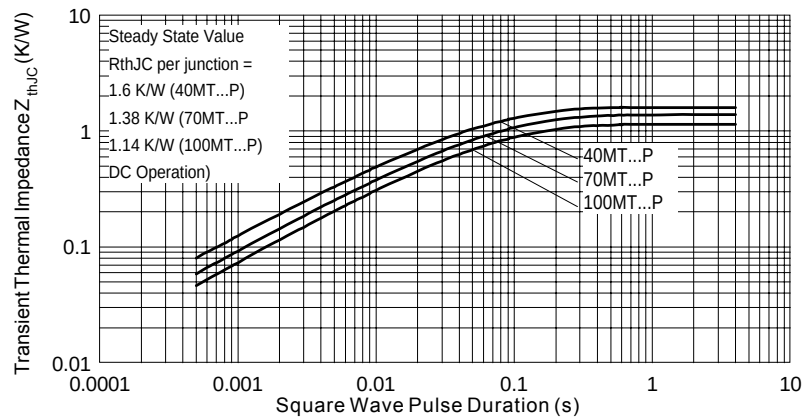


Fig. 16 - Thermal Impedance  $Z_{thJC}$  Characteristics

Data and specifications subject to change without notice.  
This product has been designed and qualified for Industrial Level.  
Qualification Standards can be found on IR's Web site.

International  
**IR** Rectifier

**IR WORLD HEADQUARTERS:** 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105  
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