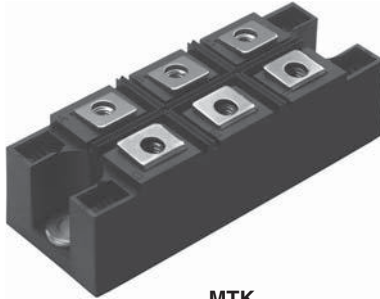



## Three Phase Bridge, 130 A to 160 A (Power Modules)



MTK

| PRIMARY CHARACTERISTICS |                    |
|-------------------------|--------------------|
| $I_O$                   | 130 A to 160 A     |
| $V_{RRM}$               | 800 V to 1600 V    |
| Package                 | MTK                |
| Circuit configuration   | Three phase bridge |

### FEATURES

- Package fully compatible with the industry standard INT-A-PAK power modules series
- High thermal conductivity package, electrically insulated case
- Excellent power volume ratio
- 4000  $V_{RMS}$  isolating voltage
- UL E78996 approved 
- Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### DESCRIPTION

A range of extremely compact, encapsulated three phase bridge rectifiers offering efficient and reliable operation. They are intended for use in general purpose and heavy duty applications.

| MAJOR RATINGS AND CHARACTERISTICS |                 |                   |                   |                   |
|-----------------------------------|-----------------|-------------------|-------------------|-------------------|
| SYMBOL                            | CHARACTERISTICS | VALUES<br>130MT.K | VALUES<br>160MT.K | UNITS             |
| $I_O$                             |                 | 130 (160)         | 160 (200)         | A                 |
|                                   | $T_C$           | 85 (62)           | 85 (60)           | °C                |
| $I_{FSM}$                         | 50 Hz           | 1130              | 1430              | A                 |
|                                   | 60 Hz           | 1180              | 1500              |                   |
| $I^2t$                            | 50 Hz           | 6400              | 10 200            | A <sup>2</sup> s  |
|                                   | 60 Hz           | 5800              | 9300              |                   |
| $I^2\sqrt{t}$                     |                 | 64 000            | 102 000           | A <sup>2</sup> √s |
| $V_{RRM}$                         | Range           | 800 to 1600       |                   | V                 |
| $T_{Stg}$                         | Range           | -40 to 150        |                   | °C                |
| $T_J$                             |                 | -40 to 150        |                   |                   |

### ELECTRICAL SPECIFICATIONS

| VOLTAGE RATINGS          |              |  |  |   |
|--------------------------|--------------|--|--|---|
| TYPE NUMBER              | VOLTAGE CODE | $V_{RRM}$ , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE<br>V | $V_{RSM}$ , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE<br>V | $I_{RRM}$ MAXIMUM AT $T_J =$ MAXIMUM mA |
| VS-130MT.K<br>VS-160MT.K | 80           | 800  | 900  | 10                                      |
|                          | 100          | 1000   | 1100   |   |
|                          | 120          | 1200   | 1300   |   |
|                          | 140          | 1400   | 1500   |   |
|                          | 160          | 1600   | 1700   |   |



| FORWARD CONDUCTION  |                     |  |                                   |  |                   |                   |                  |
|---|---------------------|--|-----------------------------------|--|-------------------|-------------------|------------------|
| PARAMETER   | SYMBOL              | TEST CONDITIONS  |                                   | VALUES<br>130MT.K                                  | VALUES<br>160MT.K | UNITS             |                  |
| Maximum DC output current at case temperature                 | I <sub>O</sub>      | 120° rect. conduction angle  |                                   | 130 (160)  | 160 (200)         | A                 |                  |
|   |                     |  |                                   | 85 (62)  | 85 (60)           | °C                |                  |
| Maximum peak, one-cycle forward, non-repetitive surge current | I <sub>FSM</sub>    | t = 10 ms  | No voltage reappplied             | Initial<br>T <sub>J</sub> = T <sub>J</sub> maximum | 1130              | 1430              | A                |
|   |                     | t = 8.3 ms   |                                   |  | 1180              | 1500              |                  |
|   |                     | t = 10 ms  | 100 % V <sub>RRM</sub> reappplied |  | 950               | 1200              |                  |
|   |                     | t = 8.3 ms   |                                   |  | 1000              | 1260              |                  |
| Maximum I <sup>2</sup> t for fusing                           | I <sup>2</sup> t    | t = 10 ms  | No voltage reappplied             | Initial<br>T <sub>J</sub> = T <sub>J</sub> maximum | 6400              | 10 200            | A <sup>2</sup> s |
|   |                     | t = 8.3 ms   |                                   |  | 5800              | 9300              |                  |
|   |                     | t = 10 ms  | 100 % V <sub>RRM</sub> reappplied |  | 4500              | 7200              |                  |
|   |                     | t = 8.3 ms   |                                   |  | 4100              | 6600              |                  |
| Maximum I <sup>2</sup> √t for fusing                          | I <sup>2</sup> √t   | t = 0.1 ms to 10 ms, no voltage reappplied   |                                   | 64 000   | 102 000           | A <sup>2</sup> √s |                  |
| Low level value of threshold voltage                          | V <sub>T(TO)1</sub> | (16.7 % × π × I <sub>T(AV)</sub> < I < π × I <sub>T(AV)</sub> ), T <sub>J</sub> maximum  |                                   | 0.78   | 0.81              | V                 |                  |
| High level value of threshold voltage                         | V <sub>T(TO)2</sub> | (I > π × I <sub>T(AV)</sub> ), T <sub>J</sub> maximum                                    |                                   | 0.99   | 1.04              |                   |                  |
| Low level value of forward slope resistance                   | r <sub>F1</sub>     | 16.7 % × π × I <sub>T(AV)</sub> < I < π × I <sub>T(AV)</sub> , T <sub>J</sub> maximum    |                                   | 4.59   | 3.52              | mΩ                |                  |
| High level of forward slope resistance                        | r <sub>F2</sub>     | (I > π × I <sub>T(AV)</sub> ), T <sub>J</sub> maximum                                    |                                   | 4.17   | 3.13              |                   |                  |
| Maximum forward voltage drop                                  | V <sub>FM</sub>     | I <sub>pk</sub> = 200 A, T <sub>J</sub> = 25 °C, t <sub>p</sub> = 400 μs single junction |                                   | 1.63   | 1.49              | V                 |                  |
| RMS isolation voltage   | V <sub>ISOL</sub>   | T <sub>J</sub> = 25 °C, all terminal shorted<br>f = 50 Hz, t = 1 s                       |                                   | 4000   |                   |                   |                  |

| THERMAL AND MECHANICAL SPECIFICATIONS                    |                                   |  |  |                   |                   |       |
|--|-----------------------------------|--|--|-------------------|-------------------|-------|
| PARAMETER  | SYMBOL                            | TEST CONDITIONS  |  | VALUES<br>130MT.K | VALUES<br>160MT.K | UNITS |
| Maximum junction operating and storage temperature range | T <sub>J</sub> , T <sub>Stg</sub> |  |  | -40 to 150        |                   | °C    |
| Maximum thermal resistance, junction to case             | R <sub>thJC</sub>                 | DC operation per module  |  | 0.16              | 0.12              | K/W   |
|  |                                   | DC operation per junction  |  | 0.93              | 0.73              |       |
|  |                                   | 120° rect. conduction angle per module   |  | 0.18              | 0.15              |       |
|  |                                   | 120° rect. conduction angle per junction   |  | 1.08              | 0.88              |       |
| Maximum thermal resistance, case to heatsink             | R <sub>thCS</sub>                 | Per module<br>Mounting surface smooth, flat and greased  |  | 0.03              |                   |       |
| Mounting torque ± 10 %                                   | to heatsink<br>to terminal        | 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. Lubricated threads. |  | 4 to 6            |                   | Nm    |
|  |                                   |  |  | 3 to 4            |                   |       |
| Approximate weight                                       |                                   |  |  | 176               |                   | g     |

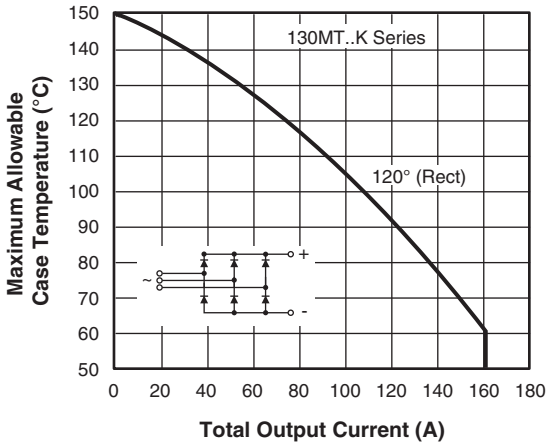


Fig. 1 - Current Rating Characteristics

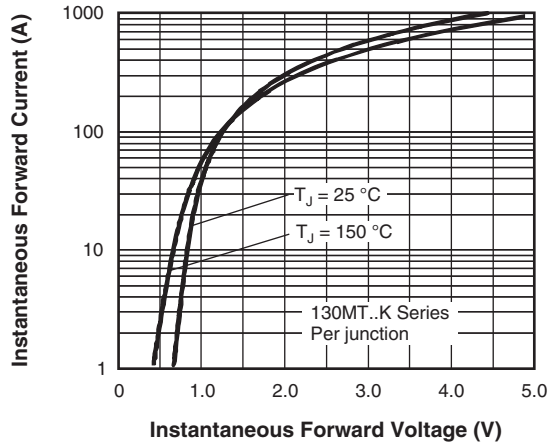


Fig. 2 - Forward Voltage Drop Characteristics

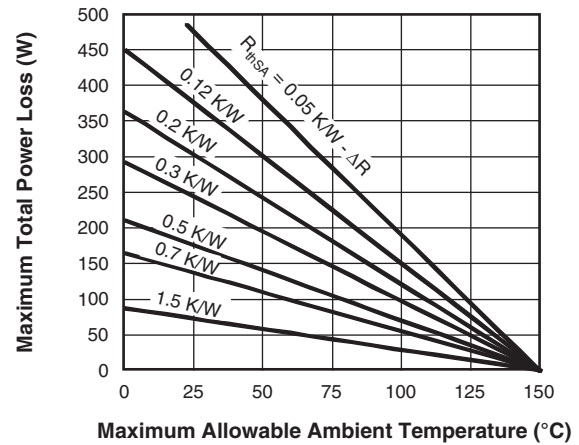
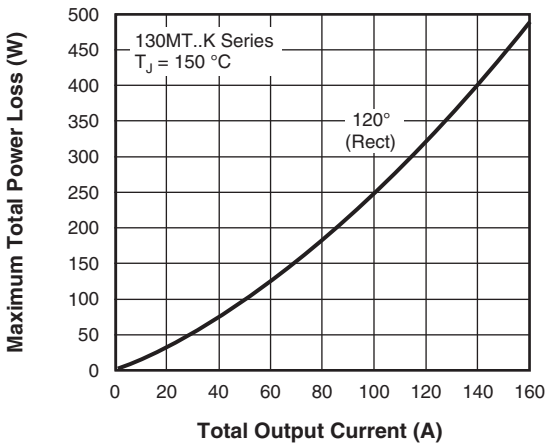


Fig. 3 - Total Power Loss Characteristics

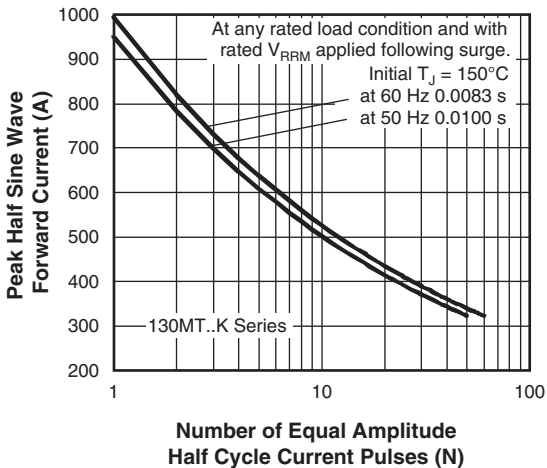


Fig. 4 - Maximum Non-Repetitive Surge Current

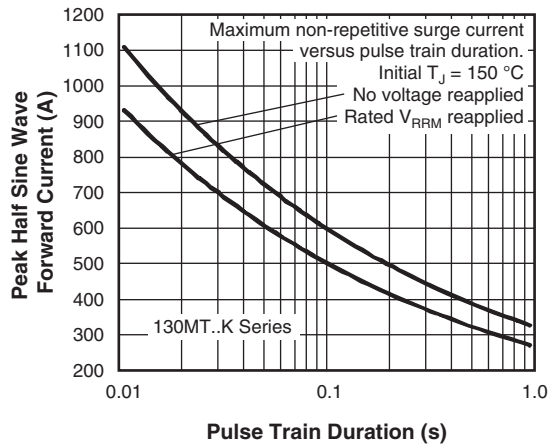


Fig. 5 - Maximum Non-Repetitive Surge Current

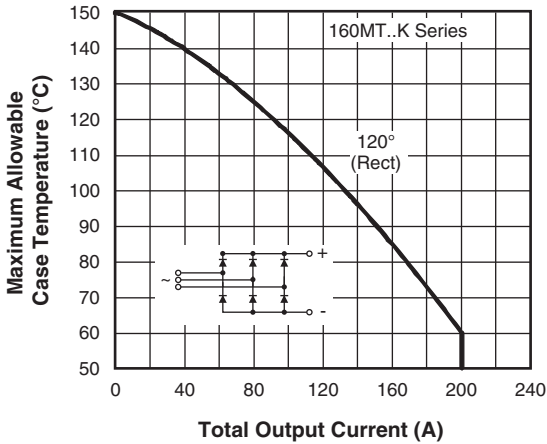


Fig. 6 - Current Ratings Characteristic

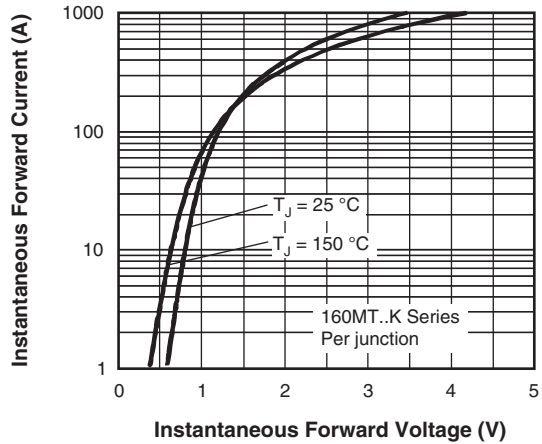


Fig. 7 - Forward Voltage Drop Characteristics

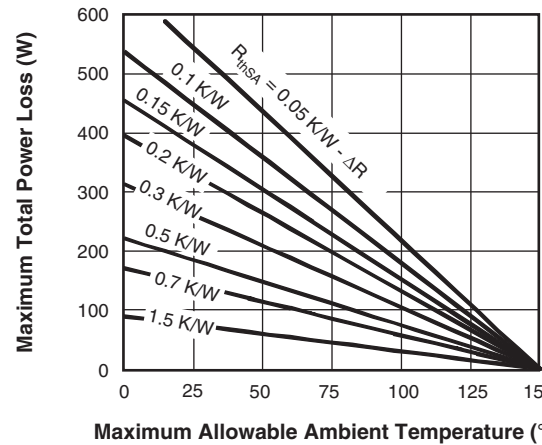
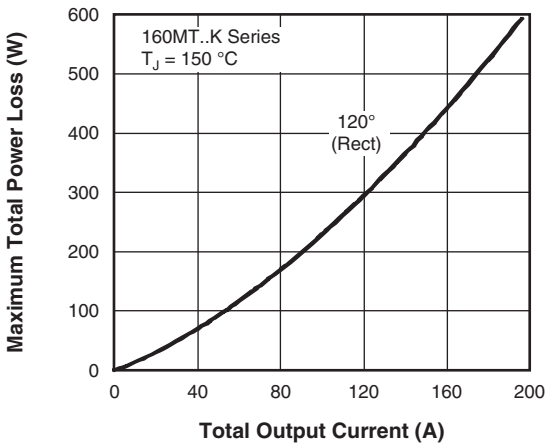


Fig. 8 - Total Power Loss Characteristics

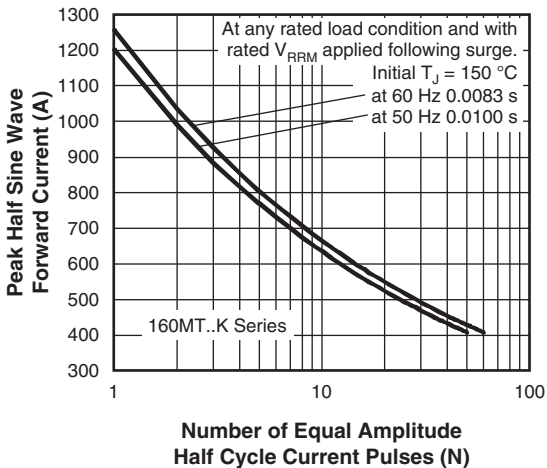


Fig. 9 - Maximum Non-Repetitive Surge Current

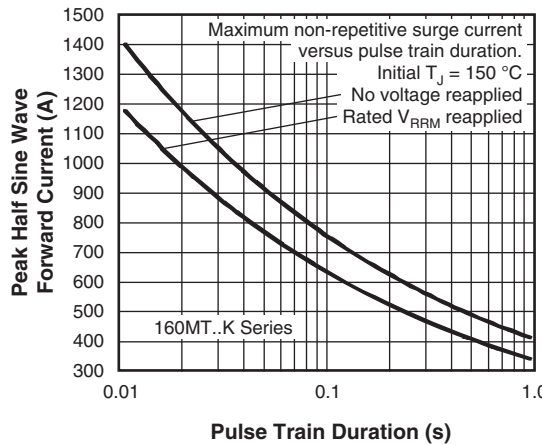


Fig. 10 - Maximum Non-Repetitive Surge Current

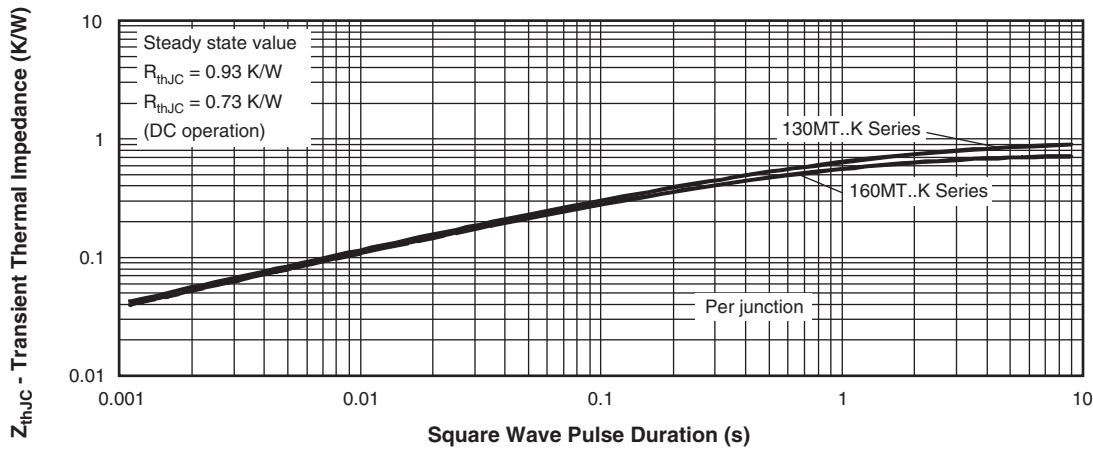


Fig. 11 - Thermal Impedance  $Z_{thJC}$  Characteristics

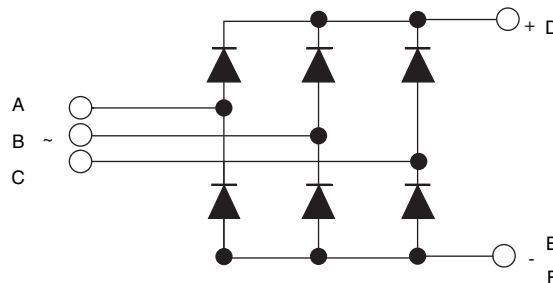
## ORDERING INFORMATION TABLE

|             |            |           |   |           |            |          |            |
|-------------|------------|-----------|---|-----------|------------|----------|------------|
| Device code | <b>VS-</b> | <b>16</b> | <b>0</b>  | <b>MT</b> | <b>160</b> | <b>K</b> | <b>PbF</b> |
|             | ①          | ②         | ③   | ④         | ⑤          |          | ⑥          |
|             | <b>1</b>   | -         | Vishay Semiconductors product                                     |           |            |          |            |
|             | <b>2</b>   | -         | Current rating code: 13 = 130 A (average)<br>16 = 160 A (average) |           |            |          |            |
|             | <b>3</b>   | -         | Three phase diodes bridge   |           |            |          |            |
|             | <b>4</b>   | -         | Essential part number   |           |            |          |            |
|             | <b>5</b>   | -         | Voltage code x 10 = $V_{RRM}$ (see Voltage Ratings table)         |           |            |          |            |
|             | <b>6</b>   | -         | PbF = Lead (Pb)-free  |           |            |          |            |

### Note

- To order the optional hardware go to: [www.vishay.com/doc?95172](http://www.vishay.com/doc?95172)

## CIRCUIT CONFIGURATION

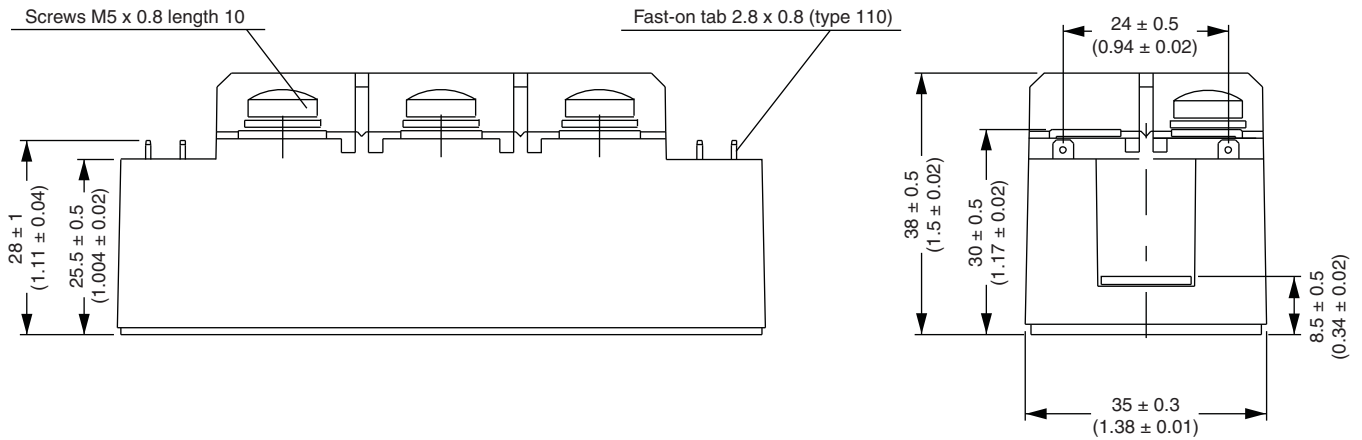


### LINKS TO RELATED DOCUMENTS

|            |  |
|------------|--|
| Dimensions | <a href="http://www.vishay.com/doc?95004">www.vishay.com/doc?95004</a> |
|------------|--|

## MTK (with and without optional barrier)

### DIMENSIONS WITH OPTIONAL BARRIERS in millimeters (inches)



# Outline Dimensions

Vishay Semiconductors MTK (with and without optional barrier)



## DIMENSIONS WITHOUT OPTIONAL BARRIERS in millimeters (inches)





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