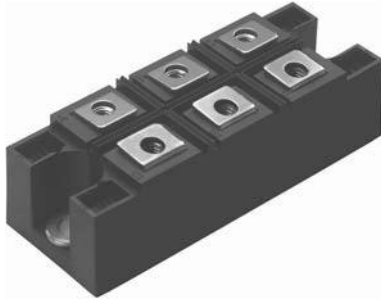


## Three Phase Bridge (Power Modules), 90/110 A



MTK

**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, outline for easy connections to power transistor and IGBT modules
- 4000 V<sub>RMS</sub> isolating voltage
- UL E78996 approved
- Totally lead (Pb)-free
- Designed and qualified for industrial level


**RoHS  
COMPLIANT**
**PRODUCT SUMMARY**

|       |          |
|-------|----------|
| $I_o$ | 90/110 A |
|-------|----------|

**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 | 90MT.K      | 110MT.K   | UNITS             |
|---------------|-----------------|-------------|-----------|-------------------|
| $I_o$         |                 | 90 (120)    | 110 (150) | A                 |
|               | $T_c$           | 90 (61)     | 90 (57)   | °C                |
| $I_{FSM}$     | 50 Hz           | 770         | 950       | A                 |
|               | 60 Hz           | 810         | 1000      |                   |
| $I^2t$        | 50 Hz           | 3000        | 4500      | A <sup>2</sup> s  |
|               | 60 Hz           | 2700        | 4100      |                   |
| $I^2\sqrt{t}$ |                 | 30 000      | 45 000    | A <sup>2</sup> √s |
| $V_{RRM}$     | Range           | 800 to 1600 |           | V                 |
| $T_{Stg}$     | Range           | - 40 to 150 |           | °C                |
| $T_J$         |                 |             |           |                   |

**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 |
|-------------|--------------|----------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------|
| 90-110MT..K | 80           | 800                                                      | 900                                                          | 10                                      |
|             | 100          | 1000                                                     | 1100                                                         |                                         |
|             | 120          | 1200                                                     | 1300                                                         |                                         |
|             | 140          | 1400                                                     | 1500                                                         |                                         |
|             | 160          | 1600                                                     | 1700                                                         |                                         |

| FORWARD CONDUCTION                                            |               |                                                                                   |                            |                                |           |               |        |
|---------------------------------------------------------------|---------------|-----------------------------------------------------------------------------------|----------------------------|--------------------------------|-----------|---------------|--------|
| PARAMETER                                                     | SYMBOL        | TEST CONDITIONS                                                                   |                            | 90MT.K                         | 110MT.K   | UNITS         |        |
| Maximum DC output current at case temperature                 | $I_o$         | 120° rect. conduction angle                                                       |                            | 90 (120)                       | 110 (150) | A             |        |
|                                                               |               |                                                                                   |                            | 90 (61)                        | 90 (57)   | °C            |        |
| Maximum peak, one-cycle forward, non-repetitive surge current | $I_{FSM}$     | t = 10 ms                                                                         | No voltage reappplied      | Initial<br>$T_J = T_J$ maximum | 770       | 950           | A      |
|                                                               |               | t = 8.3 ms                                                                        |                            |                                | 810       | 1000          |        |
|                                                               |               | t = 10 ms                                                                         | 100 % $V_{RRM}$ reappplied |                                | 650       | 800           |        |
|                                                               |               | t = 8.3 ms                                                                        |                            |                                | 680       | 840           |        |
| Maximum $I^2t$ for fusing                                     | $I^2t$        | t = 10 ms                                                                         | No voltage reappplied      | Initial<br>$T_J = T_J$ maximum | 3000      | 4500          | $A^2s$ |
|                                                               |               | t = 8.3 ms                                                                        |                            |                                | 2700      | 4100          |        |
|                                                               |               | t = 10 ms                                                                         | 100 % $V_{RRM}$ reappplied |                                | 2100      | 3200          |        |
|                                                               |               | t = 8.3 ms                                                                        |                            |                                | 1900      | 2900          |        |
| Maximum $I^2\sqrt{t}$ for fusing                              | $I^2\sqrt{t}$ | t = 0.1 to 10 ms, no voltage reappplied                                           |                            | 30 000                         | 45 000    | $A^2\sqrt{s}$ |        |
| Low level value of threshold voltage                          | $V_{F(TO)1}$  | $(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$ , $T_J$ maximum |                            | 0.89                           | 0.81      | V             |        |
| High level value of threshold voltage                         | $V_{F(TO)2}$  | $(I > \pi \times I_{F(AV)})$ , $T_J$ maximum                                      |                            | 1.05                           | 0.99      |               |        |
| Low level value of forward slope resistance                   | $r_{f1}$      | $(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$ , $T_J$ maximum |                            | 5.11                           | 4.37      | $m\Omega$     |        |
| High level value of forward slope resistance                  | $r_{f2}$      | $(I > \pi \times I_{F(AV)})$ , $T_J$ maximum                                      |                            | 4.64                           |           |               |        |
| Maximum forward voltage drop                                  | $V_{FM}$      | $I_{pk} = 150$ A, $T_J = 25$ °C<br>$t_p = 400$ $\mu s$ single junction            |                            | 1.6                            | 1.4       | V             |        |
| RMS isolation voltage                                         | $V_{ISOL}$    | $T_J = 25$ °C, all terminal shorted<br>f = 50 Hz, t = 1 s                         |                            | 4000                           |           |               |        |

| THERMAL AND MECHANICAL SPECIFICATIONS                    |                            |                                                                                                                                                              |  |             |         |               |
|----------------------------------------------------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------|---------|---------------|
| PARAMETER                                                | SYMBOL                     | TEST CONDITIONS                                                                                                                                              |  | 90MT.K      | 110MT.K | UNITS         |
| Maximum junction operating and storage temperature range | $T_J, T_{Stg}$             |                                                                                                                                                              |  | - 40 to 150 |         | °C            |
| Maximum thermal resistance, junction to case             | $R_{thJC}$                 | DC operation per module                                                                                                                                      |  | 0.21        | 0.18    | $^{\circ}C/W$ |
|                                                          |                            | DC operation per junction                                                                                                                                    |  | 1.26        | 1.07    |               |
|                                                          |                            | 120° rect. conduction angle per module                                                                                                                       |  | 0.25        | 0.21    |               |
|                                                          |                            | 120° rect. conduction angle per junction                                                                                                                     |  | 1.47        | 1.25    |               |
| Maximum thermal resistance, case to heatsink per module  | $R_{thCS}$                 | Mounting surface smooth, flat and greased                                                                                                                    |  | 0.03        |         |               |
| Mounting torque $\pm 10$ %                               | 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             |

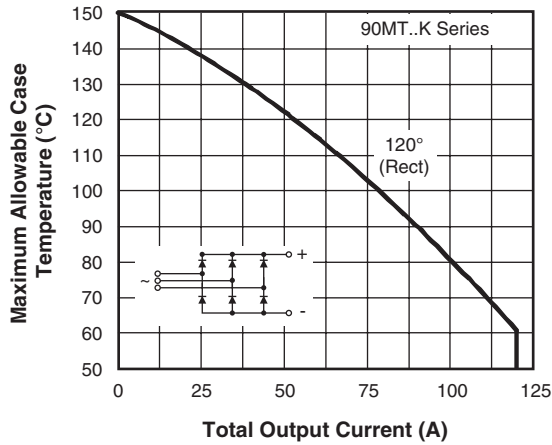


Fig. 1 - Current Ratings Characteristics

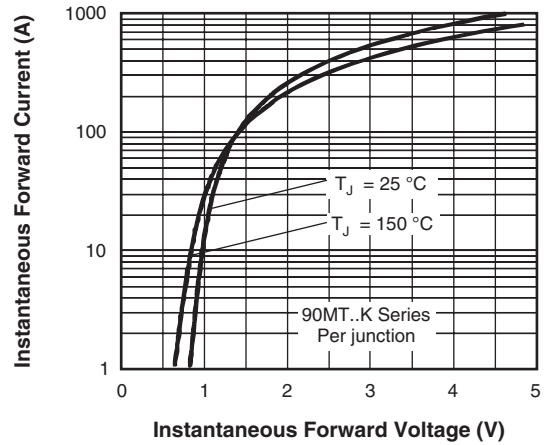


Fig. 2 - Forward Voltage Drop Characteristics

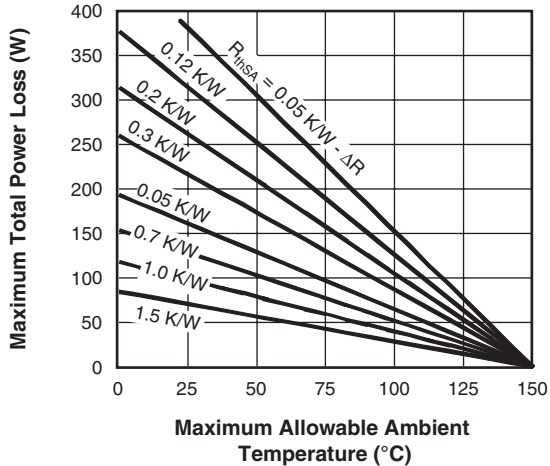
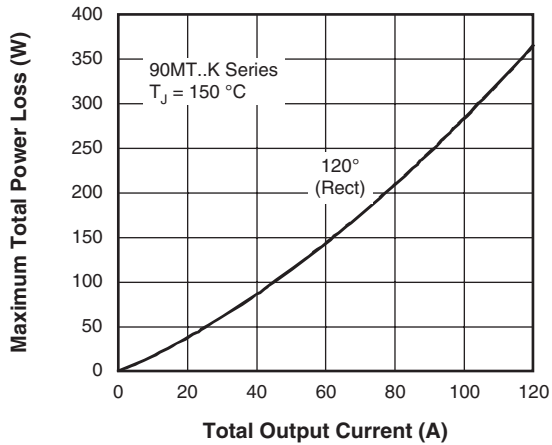


Fig. 3 - Total Power Loss Characteristics

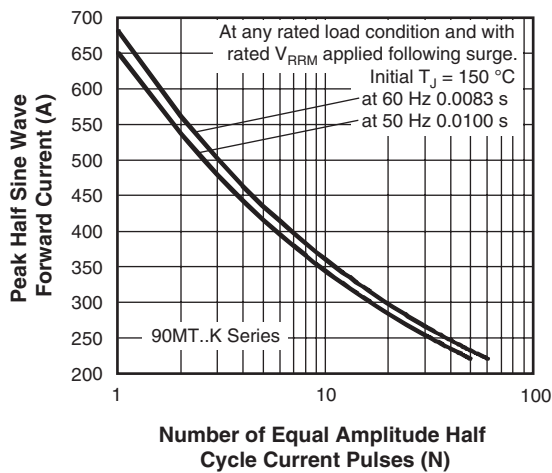


Fig. 4 - Maximum Non-Repetitive Surge Current

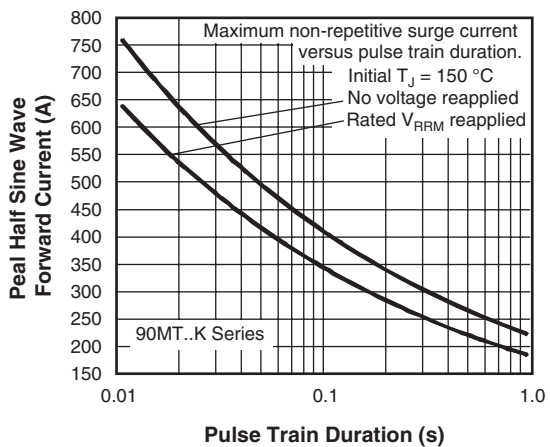


Fig. 5 - Maximum Non-Repetitive Surge Current

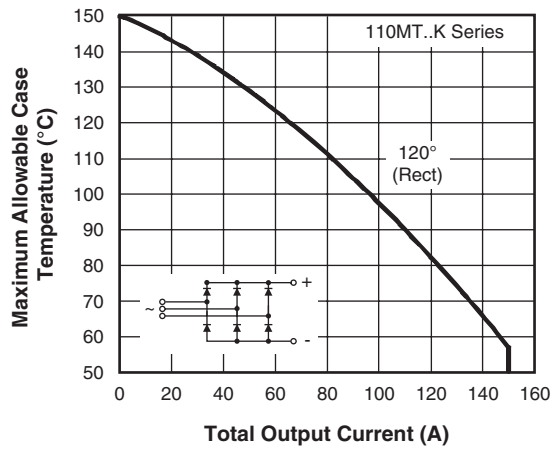


Fig. 6 - Current Ratings Characteristics

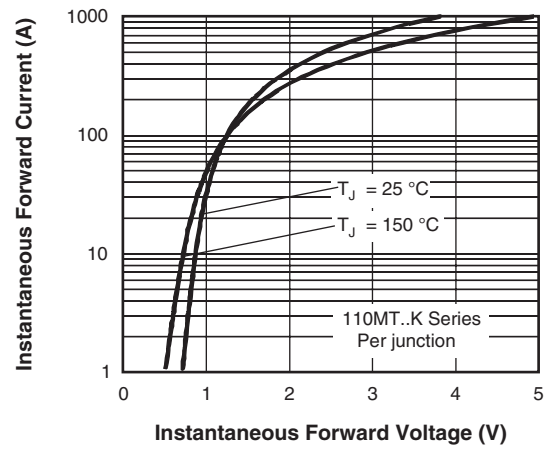


Fig. 7 - Forward Voltage Drop Characteristics

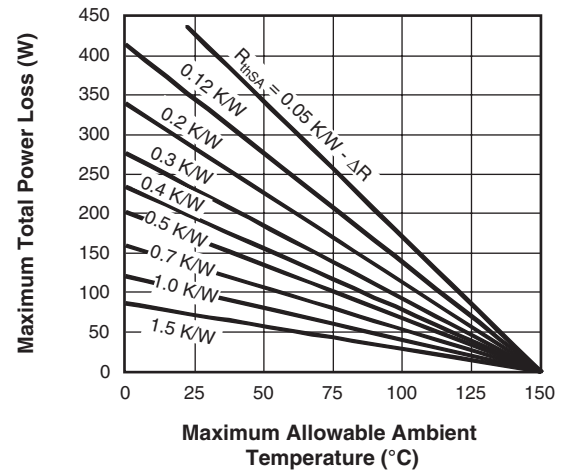
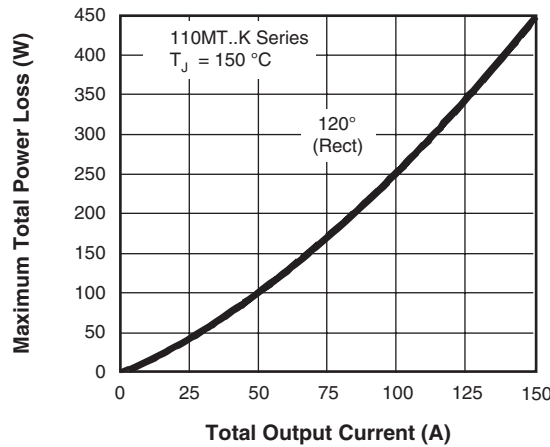


Fig. 8 - Total Power Loss Characteristics

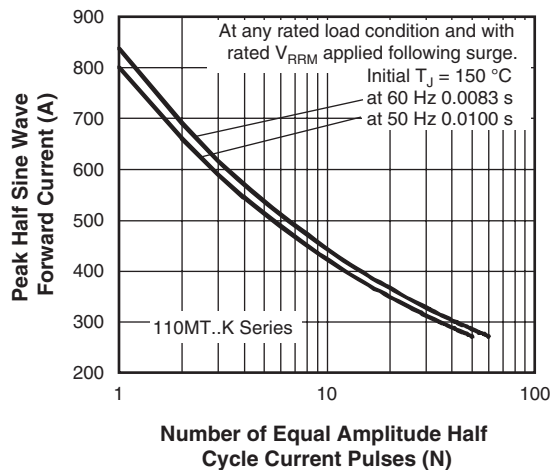


Fig. 9 - Maximum Non-Repetitive Surge Current

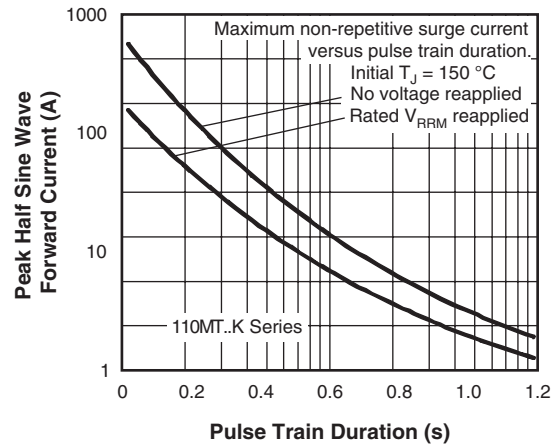


Fig. 10 - Maximum Non-Repetitive Surge Current

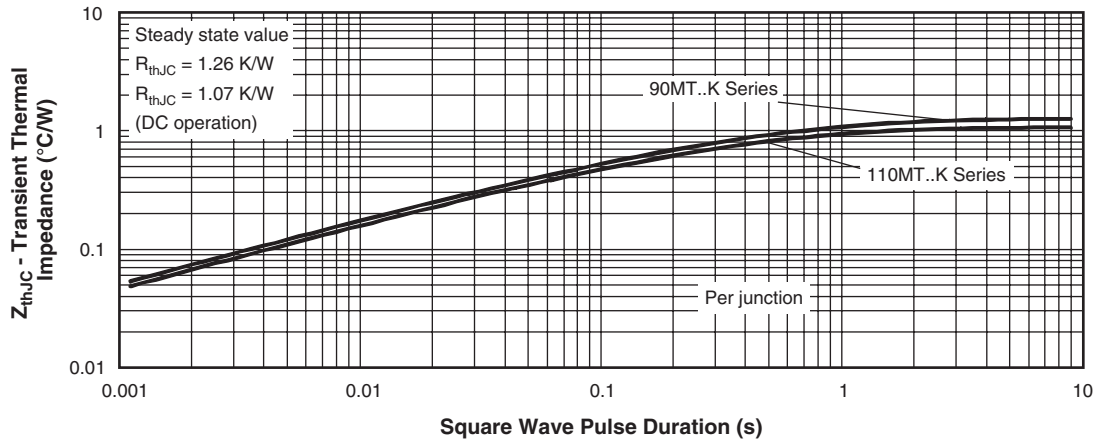


Fig. 11 - Thermal Impedance  $Z_{thJC}$  Characteristic

### ORDERING INFORMATION TABLE

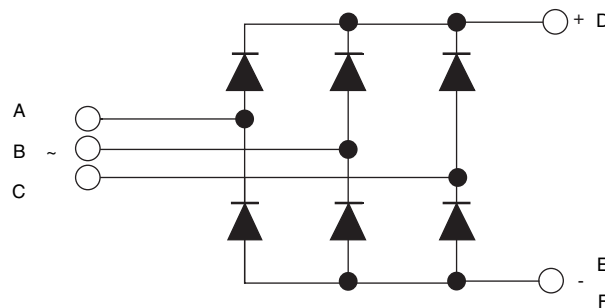
|             |           |          |           |            |          |            |
|-------------|-----------|----------|-----------|------------|----------|------------|
| Device code | <b>11</b> | <b>0</b> | <b>MT</b> | <b>160</b> | <b>K</b> | <b>PbF</b> |
|             | ①         | ②        | ③         | ④          |          | ⑤          |

- 1** - Current rating code: 9 = 90 A (average)  
11 = 110 A (average)
- 2** - Three phase diodes bridge
- 3** - Essential part number
- 4** - Voltage code x 10 =  $V_{RRM}$  (see Voltage Ratings table)
- 5** - 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 and pin out positions | <a href="http://www.vishay.com/doc?95004">http://www.vishay.com/doc?95004</a> |



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