

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


**MTC**
**FEATURES**

- Blocking voltage up to 1800 V
- High surge capability
- High thermal conductivity package, electrically insulated case
- Excellent power volume ratio
- 3600 V<sub>RMS</sub> isolating voltage
- UL approved file E78996
- Designed for industrial level
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

**PRIMARY CHARACTERISTICS**

|                       |                    |
|-----------------------|--------------------|
| $I_o$                 | 130 A at 120 °C    |
| $V_{RRM}$             | 1600 V to 1800 V   |
| Package               | MTC                |
| Circuit configuration | Three phase bridge |

**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       | UNITS             |
|----------------------|-----------------|--------------|-------------------|
| $I_o$ <sup>(1)</sup> |                 | 218          | A                 |
|                      | $T_c$           | 85           | °C                |
| $I_{FSM}$            | 50 Hz           | 1270         | A                 |
|                      | 60 Hz           | 1330         |                   |
| $I^2t$               | 50 Hz           | 8095         | A <sup>2</sup> s  |
|                      | 60 Hz           | 7390         |                   |
| $I^2\sqrt{t}$        |                 | 80 955       | A <sup>2</sup> √s |
| $V_{RRM}$            | Range           | 1600 to 1800 | V                 |
| $T_{Stg}$            | Range           | -40 to +125  | °C                |
| $T_J$                | Range           | -40 to +150  | °C                |

**Note**

<sup>(1)</sup> Maximum output current must be limited to 220 A to do not exceed the maximum temperature of terminals

**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<br>mA |
|--------------|--------------|--|--|--|
| VS-131MT...C | 160          | 1600   | 1700   | 12   |
|              | 180          | 1800   | 1900   |  |



| FORWARD CONDUCTION  |                      |   |                                  |        |                   |
|---|----------------------|---|----------------------------------|--------|-------------------|
| PARAMETER   | SYMBOL               | TEST CONDITIONS   |                                  | VALUES | UNITS             |
| Maximum DC output current at case temperature                 | I <sub>O</sub>       | 120° rect. conduction angle   |                                  | 130    | A                 |
|   |                      |   |                                  | 120    | °C                |
| Maximum peak, one-cycle forward, non-repetitive surge current | I <sub>FSM</sub>     | t = 10 ms   | No voltage reapplied             | 1270   | A                 |
|   |                      | t = 8.3 ms  |                                  |        |                   |
|   |                      | t = 10 ms   | 100 % V <sub>RRM</sub> reapplied | 1070   |                   |
|   |                      | t = 8.3 ms  |                                  |        |                   |
| Maximum I <sup>2</sup> t for fusing                           | I <sup>2</sup> t     | t = 10 ms   | No voltage reapplied             | 8095   | A <sup>2</sup> s  |
|   |                      | t = 8.3 ms  |                                  |        |                   |
|   |                      | t = 10 ms   | 100 % V <sub>RRM</sub> reapplied | 5725   |                   |
|   |                      | t = 8.3 ms  |                                  |        |                   |
| Maximum I <sup>2</sup> √t for fusing                          | I <sup>2</sup> √t    | t = 0.1 ms to 10 ms, no voltage reapplied   |                                  | 80 955 | A <sup>2</sup> √s |
| Low level value of threshold voltage                          | V <sub>FT(TO)1</sub> | (16.7 % × π × I <sub>F(AV)</sub> < I < π × I <sub>F(AV)</sub> ), T <sub>J</sub> maximum |                                  | 0.79   | V                 |
| High level value of threshold voltage                         | V <sub>FT(TO)2</sub> | (I > π × I <sub>F(AV)</sub> ), T <sub>J</sub> maximum                                   |                                  | 0.96   |                   |
| Low level value of forward slope resistance                   | r <sub>f1</sub>      | 16.7 % × π × I <sub>F(AV)</sub> < I < π × I <sub>F(AV)</sub> , T <sub>J</sub> maximum   |                                  | 4.97   | mΩ                |
| High level of forward slope resistance                        | r <sub>f2</sub>      | (I > π × I <sub>F(AV)</sub> ), T <sub>J</sub> maximum                                   |                                  | 4.63   |                   |
| Maximum forward voltage drop                                  | V <sub>FM</sub>      | I <sub>pk</sub> = 300 A, T <sub>J</sub> = 25 °C, per junction                           |                                  | 2.05   | V                 |
| RMS isolation voltage   | V <sub>ISOL</sub>    | T <sub>J</sub> = 25 °C, all terminal shorted f = 50 Hz, t = 1 s                         |                                  | 3600   |                   |

| THERMAL AND MECHANICAL SPECIFICATIONS        |                   |  |  |             |       |
|--|-------------------|--|--|-------------|-------|
| PARAMETER                                    | SYMBOL            | TEST CONDITIONS  |  | VALUES      | UNITS |
| Maximum junction operating                   | T <sub>J</sub>    |  |  | -40 to +150 | °C    |
| Maximum storage temperature                  | T <sub>Stg</sub>  |  |  | -40 to +125 |       |
| Maximum thermal resistance, junction to case | R <sub>thJC</sub> | DC operation per module  |  | 0.068       | °C/W  |
|  |                   | DC operation per junction  |  | 0.41        |       |
| Typical thermal resistance, case to heatsink | R <sub>thCS</sub> | Per module<br>Mounting surface smooth, flat, and greased   |  | 0.03        |       |
| Mounting torque ± 15 %                       | to heatsink       | A mounting compound is recommended and the torque should be rechecked after a period of 3 h to allow for the spread of the compound. Lubricated threads. |  | 5           | Nm    |
|  | to terminal       |  |  | 5           |       |
| Approximate weight                           |                   |  |  | 235         | g     |

| ΔR CONDUCTION PER JUNCTION |                           |      |       |       |       |                             |       |       |       |       |       |
|----------------------------|---------------------------|------|-------|-------|-------|-----------------------------|-------|-------|-------|-------|-------|
| DEVICES                    | SINE HALF WAVE CONDUCTION |      |       |       |       | RECTANGULAR WAVE CONDUCTION |       |       |       |       | UNITS |
|                            | 180°                      | 120° | 90°   | 60°   | 30°   | 180°                        | 120°  | 90°   | 60°   | 30°   |       |
| VS-131MT...C Series        | 0.052                     | 0.06 | 0.075 | 0.106 | 0.164 | 0.038                       | 0.063 | 0.081 | 0.109 | 0.165 | °C/W  |

**Note**

- Table shows the increment of thermal resistance R<sub>thJC</sub> when devices operate at different conduction angles than DC

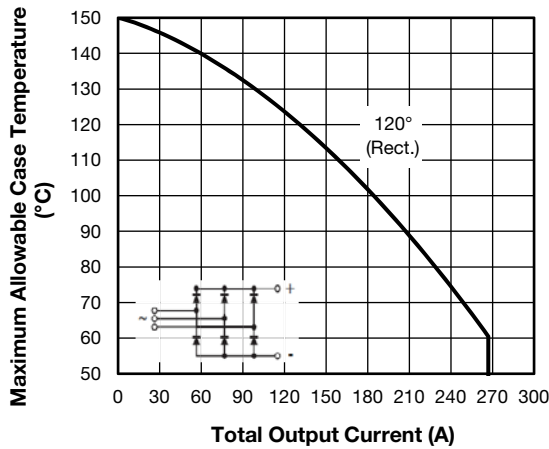


Fig. 1 - Current Ratings Characteristics

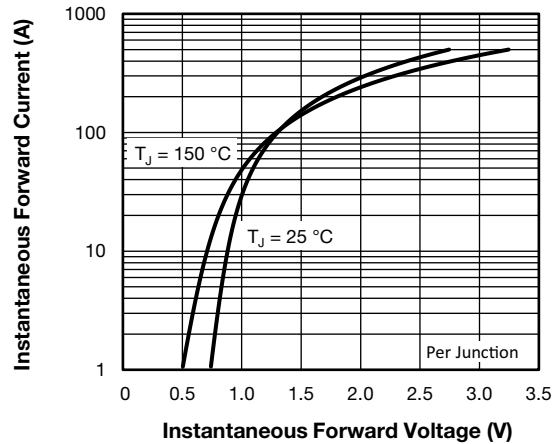


Fig. 2 - Forward Voltage Drop Characteristics

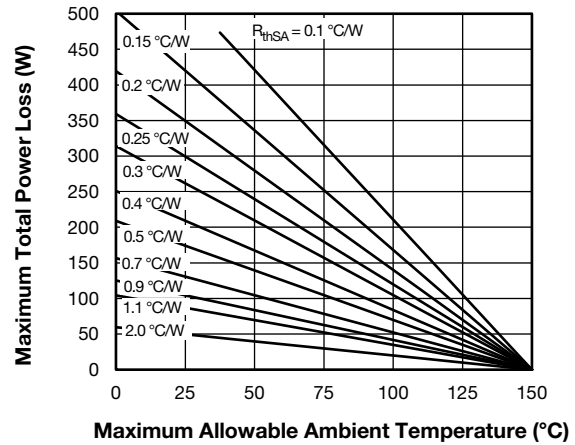
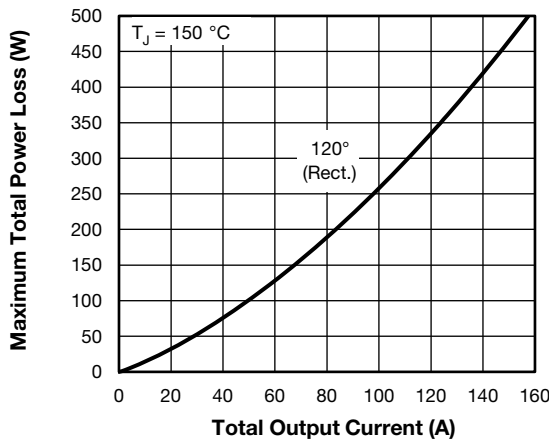


Fig. 3 - Total Power Loss Characteristics

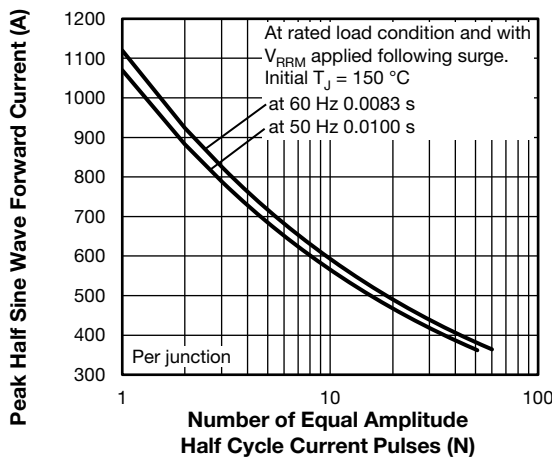


Fig. 4 - Maximum Non-Repetitive Surge Current

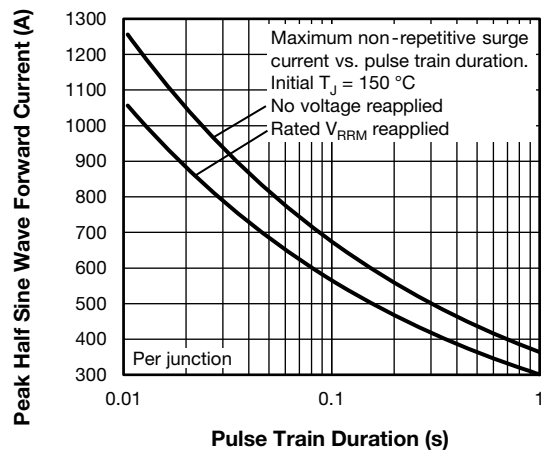


Fig. 5 - Maximum Non-Repetitive Surge Current

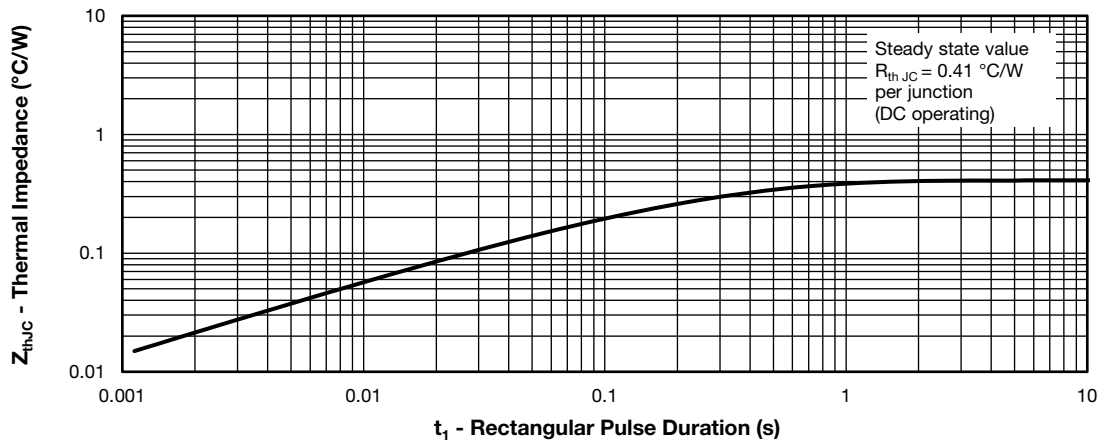
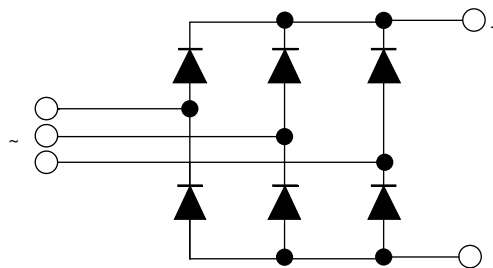


Fig. 6 - Thermal Impedance  $Z_{thJC}$  Characteristic

## ORDERING INFORMATION TABLE

|             |            |           |   |           |            |          |
|-------------|------------|-----------|---|-----------|------------|----------|
| Device code | <b>VS-</b> | <b>13</b> | <b>1</b>  | <b>MT</b> | <b>160</b> | <b>C</b> |
|             | ①          | ②         | ③   | ④         | ⑤          |          |
|             | <b>1</b>   | -         | Vishay Semiconductors product                             |           |            |          |
|             | <b>2</b>   | -         | Current rating code: 13 = 130 A (average)                 |           |            |          |
|             | <b>3</b>   | -         | Circuit configuration (three phase diodes bridge)         |           |            |          |
|             | <b>4</b>   | -         | Package indicator   |           |            |          |
|             | <b>5</b>   | -         | Voltage code x 10 = $V_{RRM}$ (see Voltage Ratings table) |           |            |          |

## CIRCUIT CONFIGURATION



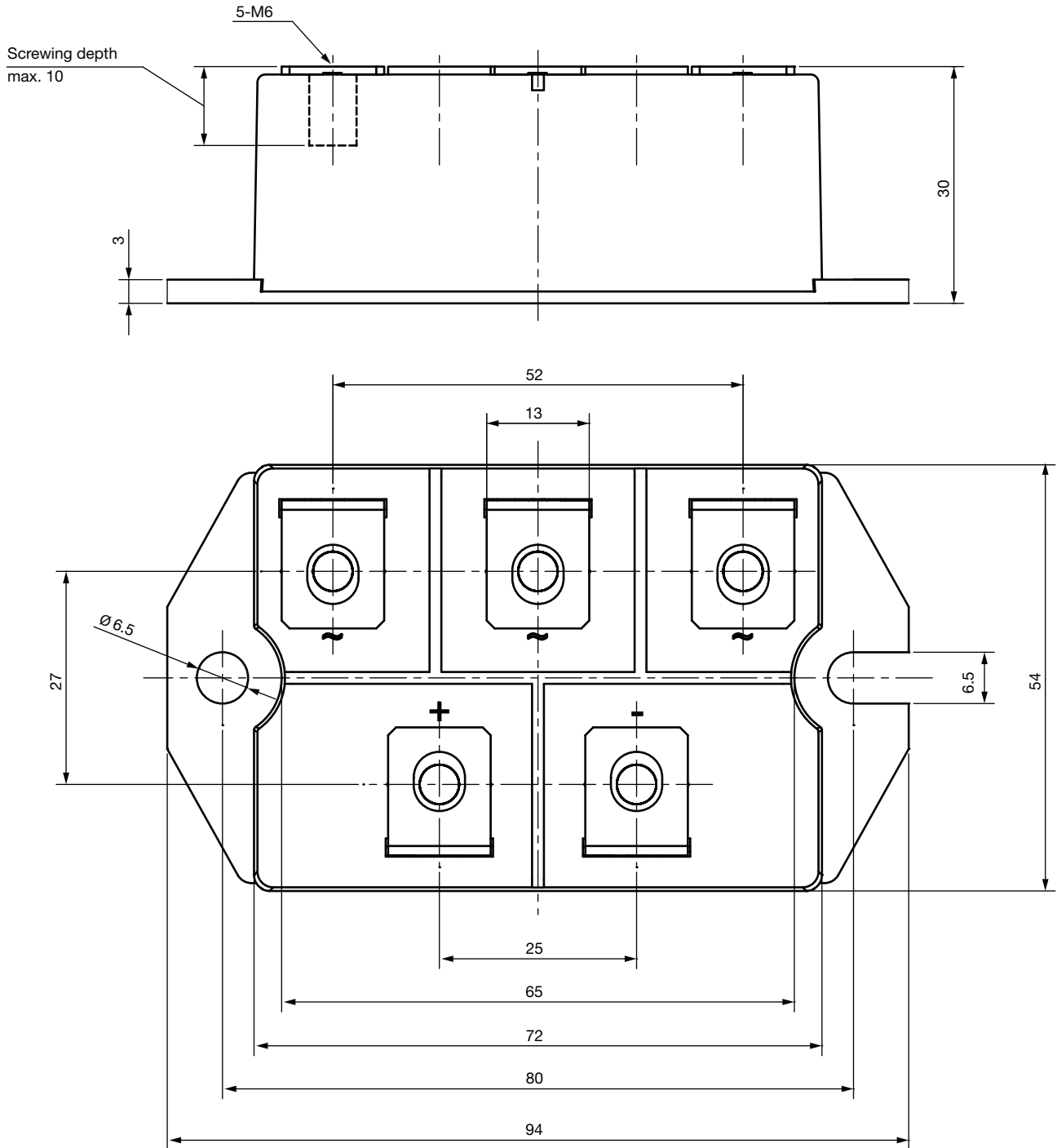
### LINKS TO RELATED DOCUMENTS

|            |  |
|------------|--|
| Dimensions | <a href="http://www.vishay.com/doc?96003">www.vishay.com/doc?96003</a> |
|------------|--|



## MTC

**DIMENSIONS** in millimeters





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