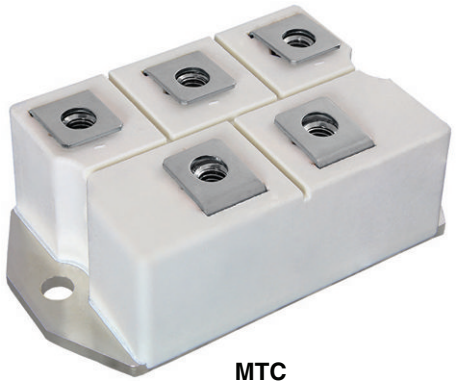
# Three Phase Bridge, 160 A (Power Modules)



MTC

## FEATURES

- Blocking voltage up to 1800 V
- High surge capability
- High thermal conductivity package, electrically insulated case
- Excellent power volume ratio
- 3600 $V_{RMS}$ isolating voltage
- UL approved file E78996
- Designed for industrial level
- Material categorization: for definitions of compliance please see 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.

| PRIMARY CHARACTERISTICS | |
|---|---|
| $I_O$ | 160 A at 118 °C |
| $V_{RRM}$ | 1600 V to 1800 V |
| Package | MTC |
| Circuit configuration | Three phase bridge |

| MAJOR RATINGS AND CHARACTERISTICS | | | |
|---|---|---|---|
| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
| $I_O$ (1) | | 257 | A |
| | $T_C$ | 85 | °C |
| $I_{FSM}$ | 50 Hz | 1540 | A |
| | 60 Hz | 1610 | |
| $I^2t$ | 50 Hz | 11 860 | $A^2s$ |
| | 60 Hz | 10 825 | |
| $I^2\sqrt{t}$ | | 118 580 | $A^2\sqrt{s}$ |
| $V_{RRM}$ | Range | 1600 to 1800 | V |
| $T_{Stg}$ | Range | -40 to +125 | °C |
| $T_J$ | Range | -40 to +150 | °C |

**Note**

(1) 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 V | $V_{RSM}$, MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V | $I_{RRM}$ MAXIMUM AT $T_J$ = MAXIMUM mA |
| VS-161MT...C | 160 | 1600 | 1700 | 12 |
| | 180 | 1800 | 1900 | |



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| FORWARD CONDUCTION | | | | | | |
|---|---|---|---|---|---|---|
| **PARAMETER** | **SYMBOL** | **TEST CONDITIONS** | | | **VALUES** | **UNITS** |
| Maximum DC output current at case temperature | $I_O$ | 120° rect. conduction angle | | | 160 | A |
| | | | | | 118 | °C |
| Maximum peak, one-cycle forward, non-repetitive surge current | $I_{FSM}$ | t = 10 ms | No voltage reapplied | Initial $T_J = T_J$ maximum | 1540 | A |
| | | t = 8.3 ms | | | 1610 | |
| | | t = 10 ms | 100 % $V_{RRM}$ reapplied | | 1295 | |
| | | t = 8.3 ms | | | 1355 | |
| Maximum $I^2t$ for fusing | $I^2t$ | t = 10 ms | No voltage reapplied | | 11 860 | $A^2s$ |
| | | t = 8.3 ms | | | 10 825 | |
| | | t = 10 ms | 100 % $V_{RRM}$ reapplied | | 8385 | |
| | | t = 8.3 ms | | | 7620 | |
| Maximum $I^2\sqrt{t}$ for fusing | $I^2\sqrt{t}$ | t = 0.1 ms to 10 ms, no voltage reapplied | | | 118 580 | $A^2\sqrt{s}$ |
| Low level value of threshold voltage | $V_{FT(TO)1}$ | (16.7 % x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), $T_J$ maximum | | | 0.81 | V |
| High level value of threshold voltage | $V_{FT(TO)2}$ | (I > π x $I_{F(AV)}$), $T_J$ maximum | | | 0.98 | |
| Low level value of forward slope resistance | $r_{f1}$ | 16.7 % x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$, $T_J$ maximum | | | 3.89 | mΩ |
| High level of forward slope resistance | $r_{f2}$ | (I > π x $I_{F(AV)}$), $T_J$ maximum | | | 3.68 | |
| Maximum forward voltage drop | $V_{FM}$ | $I_{pk}$ = 300 A, $T_J$ = 25 °C, per junction | | | 1.85 | V |
| RMS isolation voltage | $V_{ISOL}$ | $T_J$ = 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 | | $T_J$ | | -40 to +150 | °C |
| Maximum storage temperature | | $T_{Stg}$ | | -40 to +125 | |
| Maximum thermal resistance, junction to case | | $R_{thJC}$ | DC operation per module | 0.058 | °C/W |
| | | | DC operation per junction | 0.35 | |
| Typical thermal resistance, case to heatsink | | $R_{thCS}$ | 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-161MT...C Series | 0.054 | 0.061 | 0.076 | 0.107 | 0.165 | 0.039 | 0.064 | 0.083 | 0.111 | 0.167 | °C/W |

**Note**

- Table shows the increment of thermal resistance $R_{thJC}$ when devices operate at different conduction angles than DC


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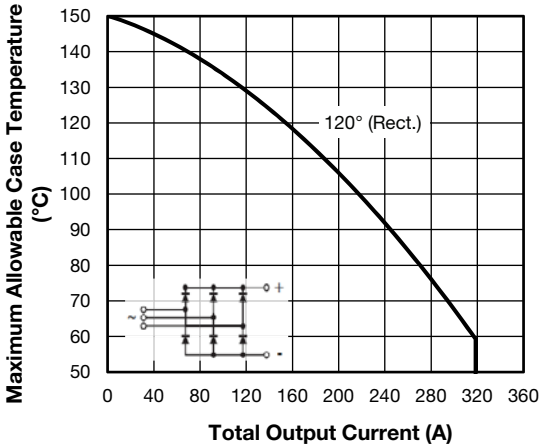



Fig. 1 - Current Ratings Characteristics

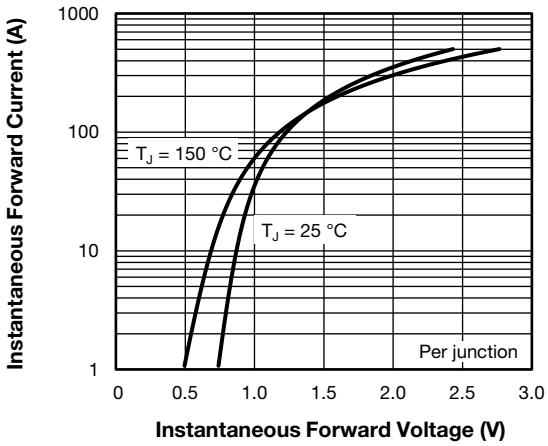
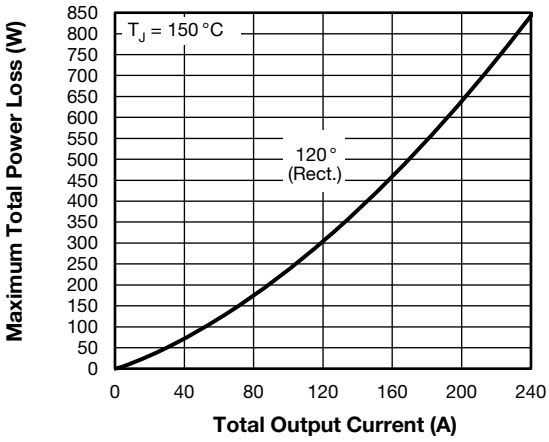



Fig. 2 - Forward Voltage Drop Characteristics



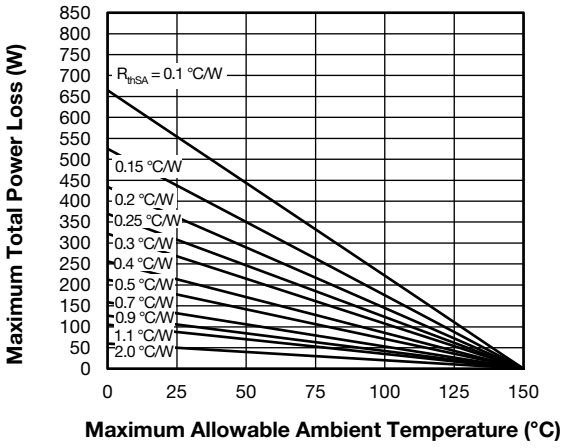




Fig. 3 - Total Power Loss Characteristics

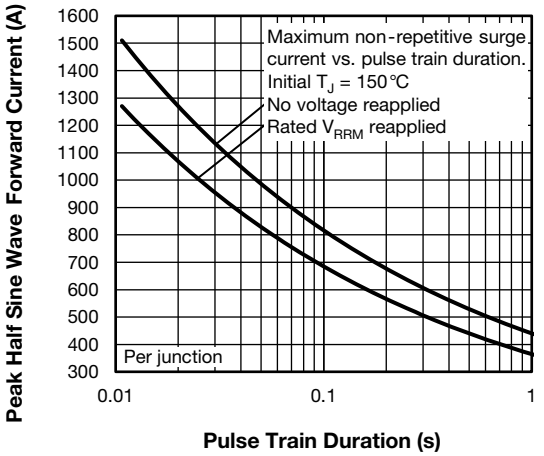



Fig. 4 - Maximum Non-Repetitive Surge Current

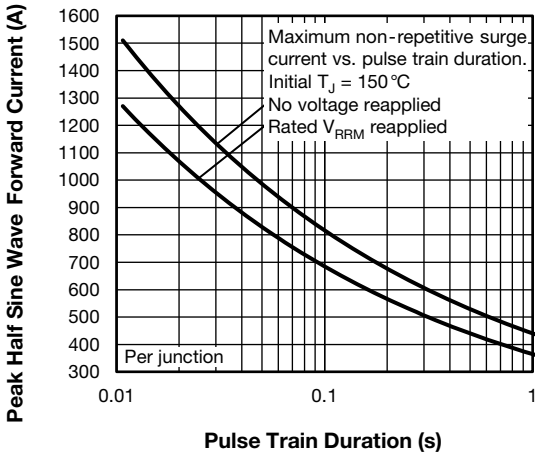



Fig. 5 - Maximum Non-Repetitive Surge Current


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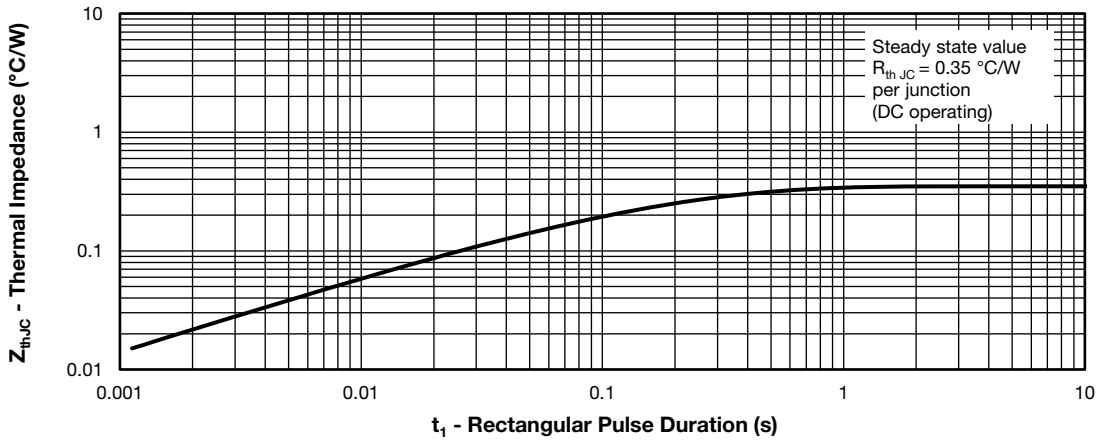



Fig. 6 - Thermal Impedance $Z_{thJC}$ Characteristic

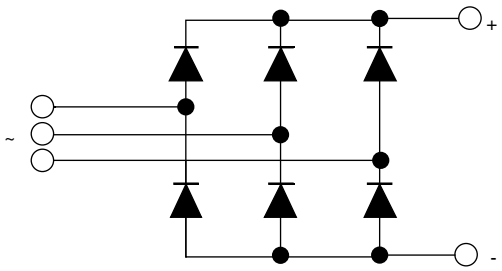
## ORDERING INFORMATION TABLE

Device code

| VS- | 16 | 1 | MT | 160 | C |
|---|---|---|---|---|---|
| ① | ② | ③ | ④ | ⑤ | |

| | | |
|---|---|---|
| 1 | - | Vishay Semiconductors product |
| 2 | - | Current rating code: 16 = 160 A (average) |
| 3 | - | Circuit configuration (three phase diodes bridge) |
| 4 | - | Package indicator |
| 5 | - | Voltage code x 10 = $V_{RRM}$ (see Voltage Ratings table) |

## CIRCUIT CONFIGURATION

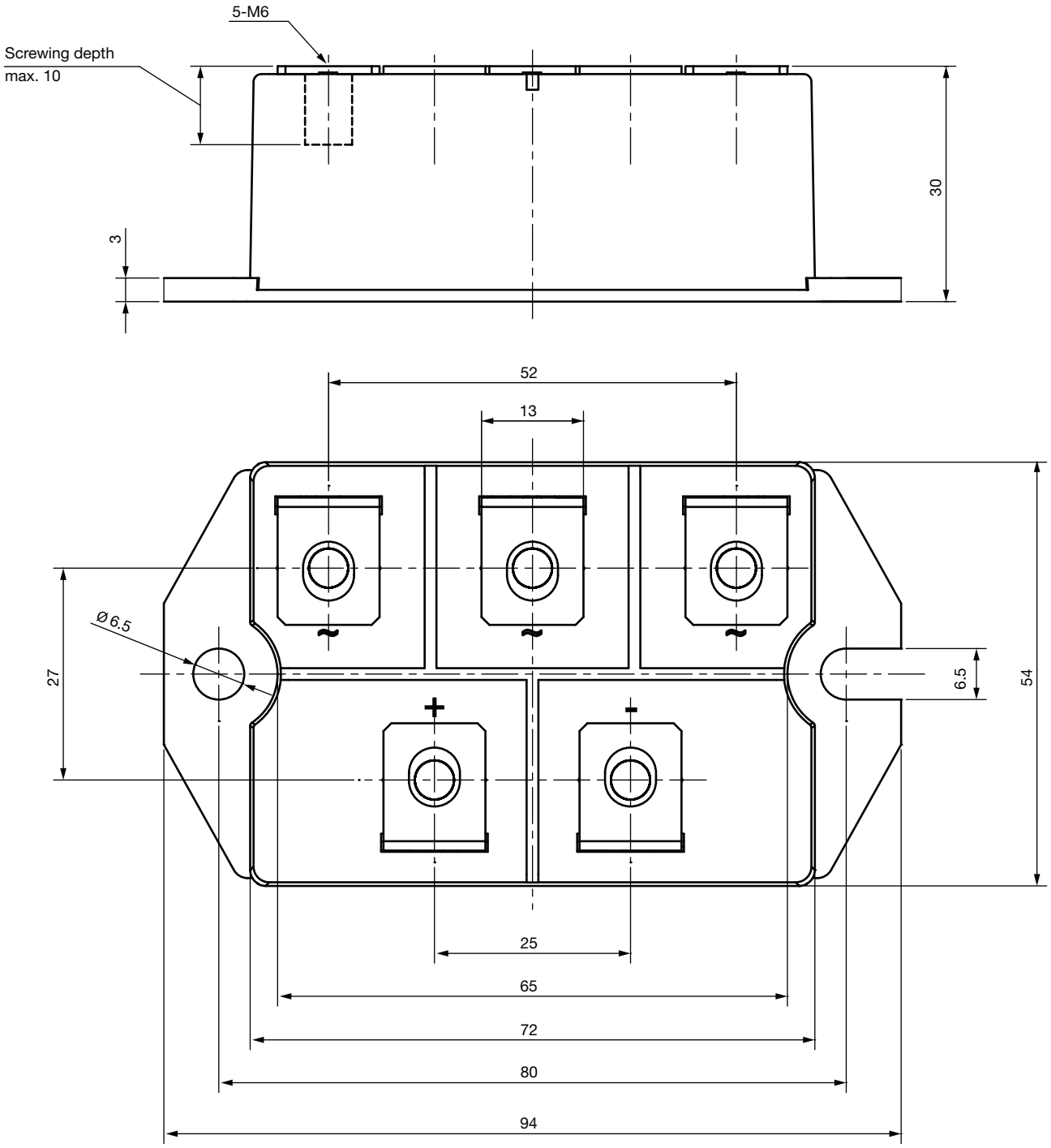



| LINKS TO RELATED DOCUMENTS | |
|---|---|
| Dimensions | www.vishay.com/doc?96003 |


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# MTC

**DIMENSIONS** in millimeters






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