# SOT-227 Power Module
# Insulated Standard Recovery Rectifier, 160 A

SOT-227

## FEATURES

- Two fully independent diodes
- Fully insulated package
- High voltage rectifiers optimized for very low forward voltage drop
- Industry standard outline
- UL approved file E78996
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT

## DESCRIPTION / APPLICATIONS

These devices are intended for use in main rectification. Single or three phase bridge.

| PRIMARY CHARACTERISTICS | |
|---|---|
| $I_{F(AV)}$ per module | 160 A, $T_C$ = 101 °C |
| $V_{FM}$ typical at 100 A | 1.16 V |
| Type | Modules - diode, high voltage |
| Package | SOT-227 |
| Circuit configuration | Two separate diodes, parallel pin-out |

| MAJOR RATINGS AND CHARACTERISTICS | | | |
|---|---|---|---|
| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
| $I_{F(AV)}$ | 90 °C | 91 | A |
| $I_{F(RMS)}$ | | 138 | |
| $I_{FSM}$ | 50 Hz | 940 | |
| | 60 Hz | 985 | |
| $I^2t$ | 50 Hz | 4420 | $A^2s$ |
| | 60 Hz | 4015 | |
| $I^2\sqrt{t}$ | | 44 180 | $A^2\sqrt{s}$ |
| $V_{RRM}$ | | 1200 | V |
| $T_J$ | | -55 to +150 | °C |

## 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 | $I_{RRM}$ TYPICAL AT 150 °C mA |
| VS-RA160FA120 | 120 | 1200 | 1300 | 1.0 |

| FORWARD CONDUCTION | | | | | | |
|---|---|---|---|---|---|---|
| PARAMETER | SYMBOL | TEST CONDITIONS | | | VALUES | UNITS |
| Maximum average forward current at case temperature per leg | $I_{F(AV)}$ | 180° conduction, half sine wave, 90 °C | | | 91 | A |
| Maximum RMS forward current per leg | $I_{F(RMS)}$ | DC at 101 °C case temperature | | | 138 | A |
| Maximum peak, one-cycle forward, non-repetitive surge current per leg | $I_{FSM}$ | t = 10 ms | No voltage reapplied | Sinusoidal half wave, initial $T_J = T_J$ maximum | 940 | |
| | | t = 8.3 ms | | | 985 | |
| | | t = 10 ms | 100 % $V_{RRM}$ reapplied | | 790 | |
| | | t = 8.3 ms | | | 825 | |
| Maximum $I^2t$ for fusing per leg | $I^2t$ | t = 10 ms | No voltage reapplied | | 4420 | $A^2s$ |
| | | t = 8.3 ms | | | 4015 | |
| | | t = 10 ms | 100 % $V_{RRM}$ reapplied | | 3125 | |
| | | t = 8.3 ms | | | 2840 | |
| Maximum $I^2\sqrt{t}$ for fusing per leg | $I^2\sqrt{t}$ | t = 0.1 ms to 10 ms, no voltage reapplied | | | 44 180 | $A^2\sqrt{s}$ |
| Low level of threshold voltage per leg | $V_{F(TO)1}$ | (16.7 % x π x $I_{F(AV)}$) < I < π x $I_{F(AV)}$, $T_J = T_J$ maximum | | | 0.80 | V |
| Low level value of forward slope resistance | $r_{f1}$ | | | | 4.32 | mΩ |
| High level of threshold voltage per leg | $V_{F(TO)2}$ | (I > π x $I_{F(AV)}$), $T_J = T_J$ maximum | | | 0.93 | V |
| High level value of forward slope resistance | $r_{f2}$ | | | | 4.14 | mΩ |
| Maximum forward voltage drop per leg | $V_{FM}$ | $I_{FM}$ = 100 A, $T_J$ = 25 °C | | | 1.27 | V |
| | | $I_{FM}$ = 100 A, $T_J$ = 150 °C | | | 1.22 | |

| BLOCKING | | | | |
|---|---|---|---|---|
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
| Maximum peak reverse leakage current per leg | $I_{RRM}$ | $T_J$ = 25 °C | 150 | µA |
| | | $T_J$ = 150 °C | 1.5 | mA |
| RMS insulation voltage | $V_{INS}$ | $T_J$ = 25 °C, any terminal to case, t = 1 minute | 2500 | V |

| THERMAL AND MECHANICAL SPECIFICATIONS | | | | | | |
|---|---|---|---|---|---|---|
| PARAMETER | | SYMBOL | MIN. | TYP. | MAX. | UNITS |
| Thermal resistance, junction to case | per leg | $R_{thJC}$ | - | - | 0.26 | °C/W |
| | per module | | - | - | 0.13 | |
| Thermal resistance, case to heatsink | per module | $R_{thCS}$ | - | 0.1 | - | |
| Weight | | | - | 30 | - | g |
| Mounting torque to terminal | | | - | - | 1.1 (9.7) | Nm (lbf. in) |
| Mounting torque to heatsink | | | - | - | 1.8 (15.9) | Nm (lbf. in) |
| Case style | | | SOT-227 | | | |

| ΔR CONDUCTION PER JUNCTION | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DEVICE | SINE HALF WAVE CONDUCTION | | | | | RECTANGULAR WAVE CONDUCTION | | | | | UNITS |
| | 180° | 120° | 90° | 60° | 30° | 180° | 120° | 90° | 60° | 30° | |
| VS-RA160FA120 | 0.109 | 0.122 | 0.149 | 0.213 | 0.355 | 0.069 | 0.119 | 0.159 | 0.223 | 0.358 | °C/W |

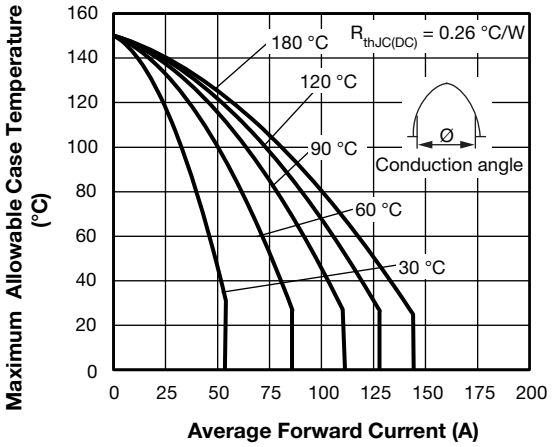



Fig. 1 - Current Ratings Characteristics (A)

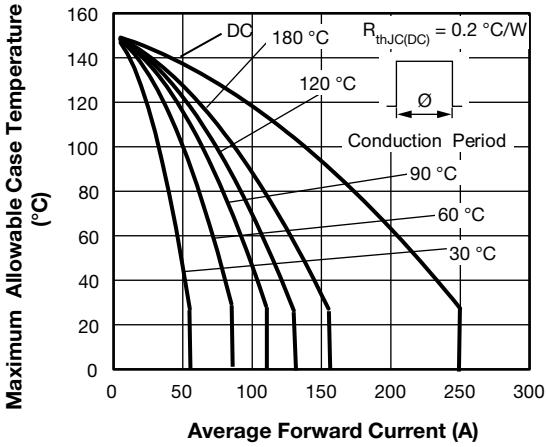



Fig. 2 - Current Ratings Characteristics (A)

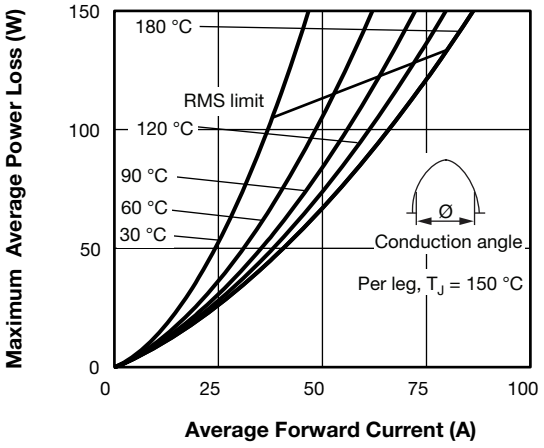



Fig. 3 - Current Ratings Characteristics (A)

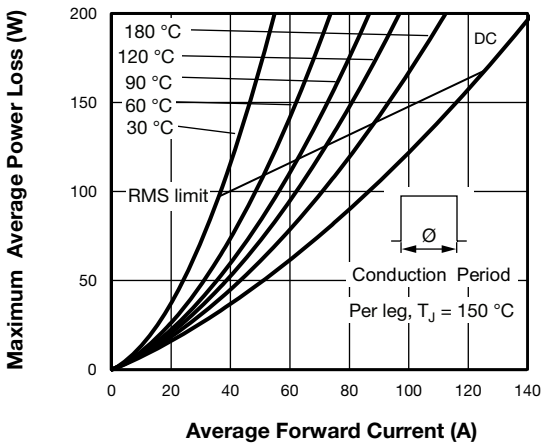



Fig. 4 - Forward Power Loss Characteristics

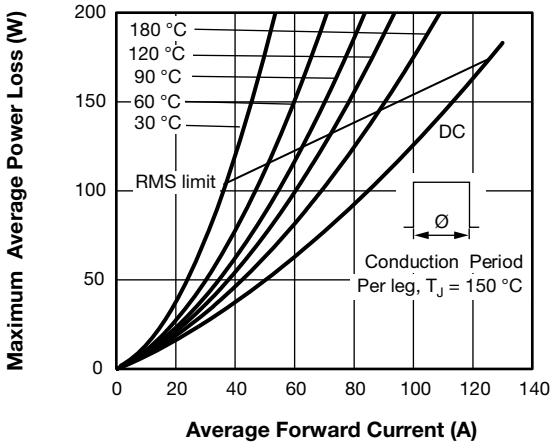



Fig. 5 - Forward Power Loss Characteristics

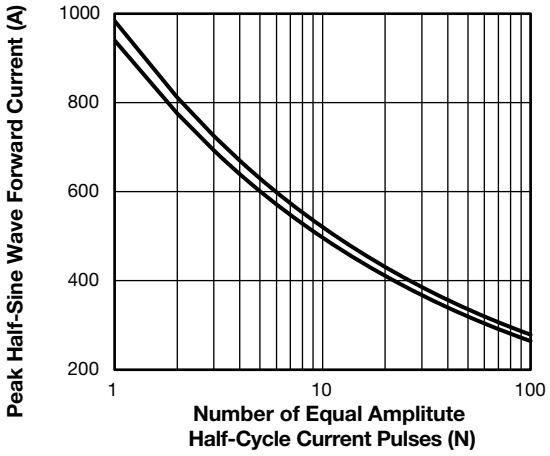



Fig. 6 - Maximum Non-Repetitive Surge Current

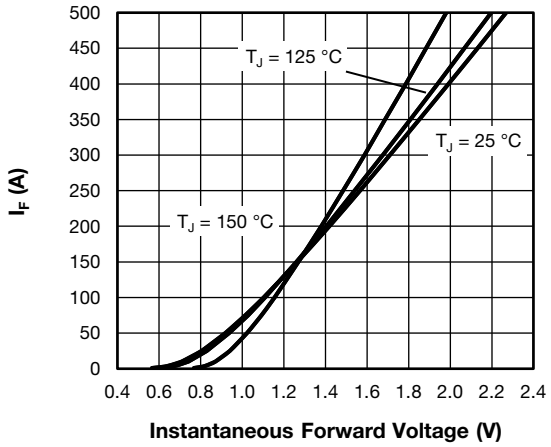



Fig. 7 - Typical Forward Voltage Characteristics

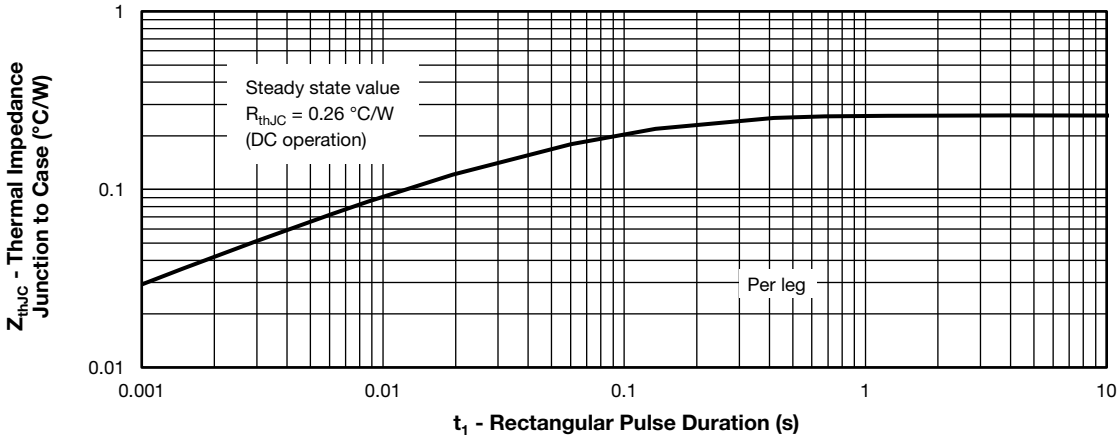


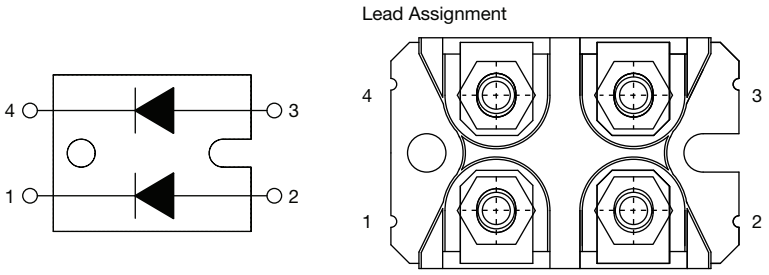

Fig. 8 - Thermal Impedance $Z_{thJC}$ Characteristics

## ORDERING INFORMATION TABLE

**Device code**

| VS- | R | A | 160 | F | A | 120 |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

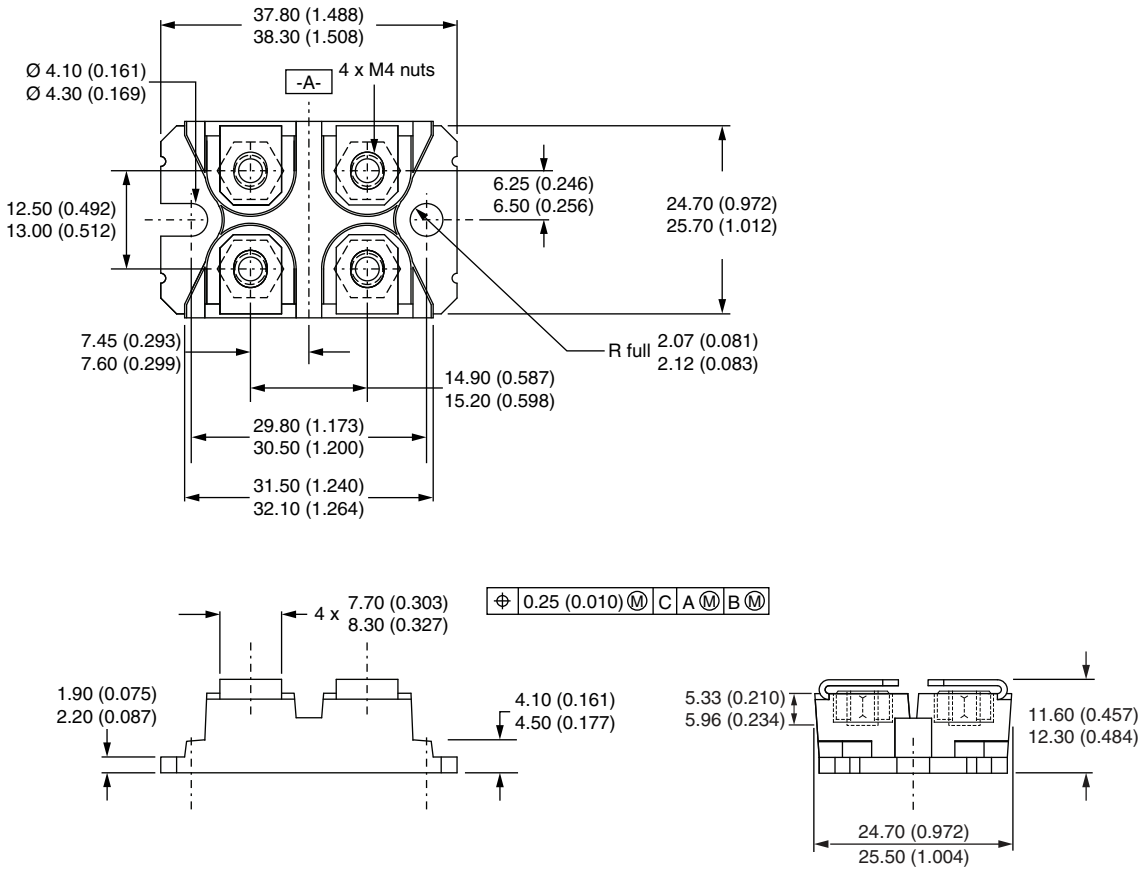
- 1 - Vishay Semiconductors product
- 2 - Standard recovery diode
- 3 - Present silicon generation
- 4 - Current rating (160 = 160 A)
- 5 - Circuit configuration (2 separate diodes, parallel pin-out)
- 6 - Package indicator (SOT-227 standard insulated base)
- 7 - Voltage rating (120 = 1200 V)

| CIRCUIT CONFIGURATION | | |
|---|---|---|
| **CIRCUIT DESCRIPTION** | **CIRCUIT CONFIGURATION CODE** | **CIRCUIT DRAWING** |
| Two separate diodes, parallel pin-out | F |  |

| LINKS TO RELATED DOCUMENTS | |
|---|---|
| Dimensions | www.vishay.com/doc?95423 |
| Packaging information | www.vishay.com/doc?95425 |

# SOT-227 Generation 2

**DIMENSIONS** in millimeters (inches)




**Note**

- Controlling dimension: millimeter

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