

Insulated Single Phase Hyperfast Bridge (Power Modules), 60 A



SOT-227

FEATURES

- Hyperfast and soft recovery characteristic
- Electrically isolated base plate
- Simplified mechanical designs, rapid assembly
- High operation junction temperature (T_J max. = 175 °C)
- Designed and qualified for industrial and consumer level
- UL approved file E78996
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT

| PRIMARY CHARACTERISTICS | |
|-------------------------|-----------------------------|
| V_{RRM} | 650 V |
| I_O at $T_C = 123$ °C | 60 A |
| t_{rr} | 63 ns |
| Type | Modules - Bridge, Hyperfast |
| Package | SOT-227 |
| Circuit configuration | Single phase bridge |

DESCRIPTION

The semiconductor in the SOT-227 package is isolated from the copper base plate, allowing for common heatsinks and compact assemblies to be built.

| MAJOR RATINGS AND CHARACTERISTICS | | | |
|-----------------------------------|-----------------|-------------|------------------|
| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
| I_O | | 60 | A |
| | T_C | 123 | °C |
| I_{FSM} | 50 Hz | 360 | A |
| | 60 Hz | 377 | |
| I^2t | 50 Hz | 648 | A ² s |
| | 60 Hz | 589 | |
| V_{RRM} | | 650 | V |
| T_J | | -55 to +175 | °C |

ELECTRICAL SPECIFICATIONS

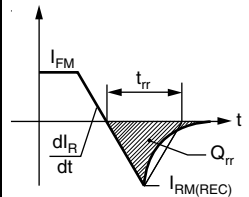
| VOLTAGE RATINGS | | | | |
|-----------------|--------------|--|--|--|
| TYPE NUMBER | VOLTAGE CODE | V_{RRM} , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE V | V_{RSM} , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V | I_{RRM} MAXIMUM AT T_J MAXIMUM mA |
| UFH60BA65 | 65 | 650 | 700 | 2 |

| ELECTRICAL SPECIFICATIONS ($T_J = 25$ °C unless otherwise specified) | | | | | | | |
|---|------------|--|------|------|------|---------|--|
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNITS | |
| Cathode to anode breakdown voltage | V_{BR} | $I_R = 250$ μ A | 650 | - | - | V | |
| Forward voltage, per diode | V_{FM} | $I_F = 60$ A | - | 1.7 | 2.35 | | |
| Reverse leakage current, per leg | I_{RM} | $V_R = 650$ V | - | 1.0 | 100 | μ A | |
| | | $V_R = 650$ V, $T_J = 150$ °C | - | 250 | - | | |
| RMS isolation voltage base plate | V_{ISOL} | $f = 50$ Hz, any terminal to case, $t = 1$ min | 2500 | - | - | V | |



| FORWARD CONDUCTION | | | | | |
|--|---------------------|---|----------------------------------|--------|--------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum DC output current at case temperature | I _o | Resistive or inductive load | | 60 | A |
| | | | | 123 | °C |
| Maximum peak, one-cycle non-repetitive forward current | I _{FSM} | t = 10 ms | No voltage reapplied | 360 | A |
| | | t = 8.3 ms | | 377 | |
| | | t = 10 ms | 100 % V _{RRM} reapplied | 303 | |
| | | t = 8.3 ms | | 317 | |
| Maximum I ² t for fusing | I ² t | t = 10 ms | No voltage reapplied | 648 | A ² s |
| | | t = 8.3 ms | | 589 | |
| | | t = 10 ms | 100 % V _{RRM} reapplied | 458 | |
| | | t = 8.3 ms | | 417 | |
| Maximum I ² √t for fusing | I ² √t | I ² t for time t _x = I ₂ √t × √t _x ; 0.1 ≤ t _x ≤ 10 ms, V _{RRM} = 0 V | | 6.4 | kA ² √s |
| Low level of threshold voltage, per leg | V _{F(T0)1} | (16.7 % × π × I _{F(AV)}) < I < π × I _{F(AV)} , T _J = T _J maximum | | 0.88 | V |
| Low level value of forward slope resistance | r _{f1} | | | 16.49 | mΩ |
| High level of threshold voltage, per leg | V _{F(T0)2} | (I > π × I _{F(AV)}), T _J = T _J maximum | | 1.16 | V |
| High level value of forward slope resistance | r _{f2} | | | 15.87 | mΩ |
| Maximum forward voltage, per diode | V _{FM} | I _F = 60 A | | 2.35 | V |

| RECOVERY CHARACTERISTICS | | | | |
|---|-----------------|--|--------|-------|
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
| Typical reverse recovery time, per diode | t _{rr} | T _J = 25 °C, I _F = 50 A, V _R = 200 V, dI _F /dt = 200 A/μs | 63 | ns |
| | | T _J = 125 °C, I _F = 50 A, V _R = 200 V, dI _F /dt = 200 A/μs | 134 | |
| Typical reverse recovery current, per diode | I _{rr} | T _J = 25 °C, I _F = 50 A, V _R = 200 V, dI _F /dt = 200 A/μs | 4.1 | A |
| | | T _J = 125 °C, I _F = 50 A, V _R = 200 V, dI _F /dt = 200 A/μs | 11.4 | |
| Typical reverse recovery charge, per diode | Q _{rr} | T _J = 25 °C, I _F = 50 A, V _R = 200 V, dI _F /dt = 200 A/μs | 130 | nC |
| | | T _J = 125 °C, I _F = 50 A, V _R = 200 V, dI _F /dt = 200 A/μs | 765 | |
| Typical junction capacitance | C _T | V _R = 650 V | 77 | pF |



| THERMAL AND MECHANICAL SPECIFICATIONS | | | | | | |
|--|-----------------------------------|-----------------------|---------|------|------------|-------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNITS |
| Junction and storage temperature range | T _J , T _{Stg} | | -55 | - | 175 | °C |
| Thermal resistance junction to case, per diode | R _{thJC} | | - | - | 0.91 | °C/W |
| Thermal resistance case to heatsink | R _{thCS} | Flat, greased surface | - | 0.1 | - | |
| Weight | | | - | 30 | - | g |
| Mounting torque | | Torque to terminal | - | - | 1.1 (9.7) | Nm (lbf.in) |
| | | Torque to heatsink | - | - | 1.3 (11.5) | Nm (lbf.in) |
| Case style | | | SOT-227 | | | |

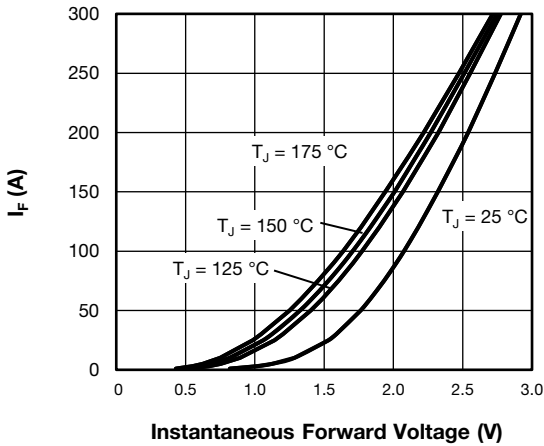


Fig. 1 - Typical Forward Voltage Characteristics

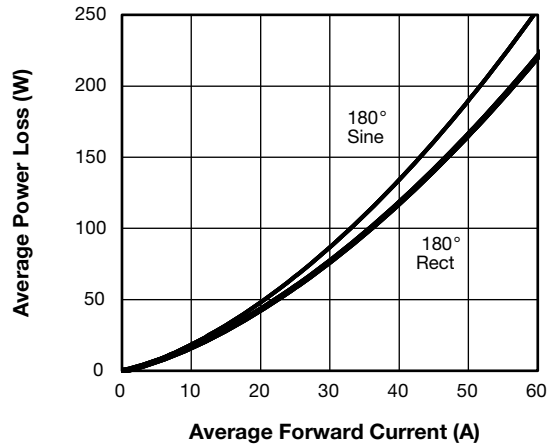


Fig. 4 - Forward Power Loss Characteristics

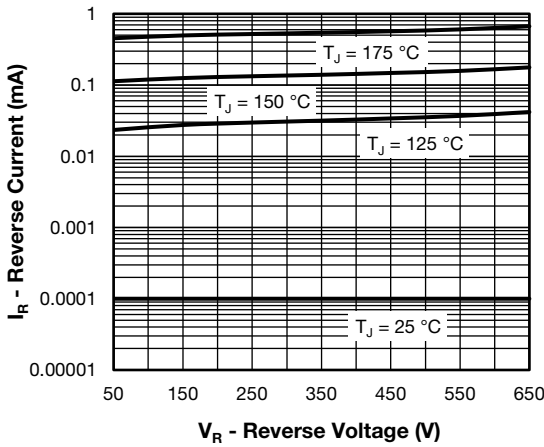


Fig. 2 - Typical Reverse Current vs. Reverse Voltage (Per Diode)

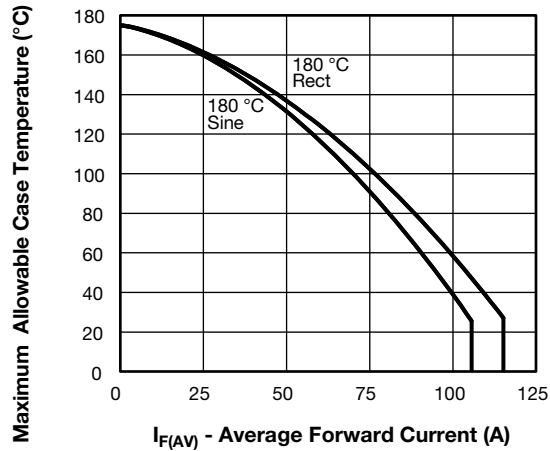


Fig. 5 - Current Rating Characteristics (A)

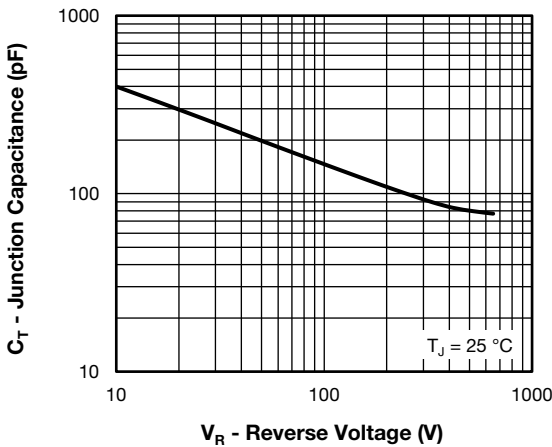


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Diode)

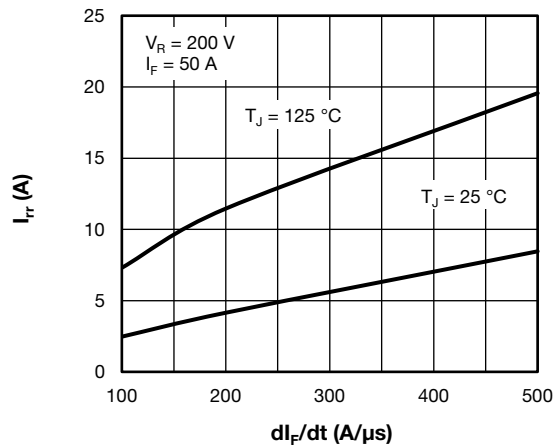


Fig. 6 - Typical Reverse Recovery Current vs. di_F/dt

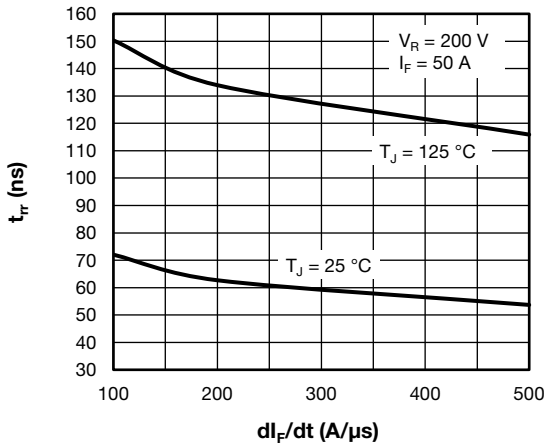


Fig. 7 - Typical Reverse Recovery Time vs. di_F/dt

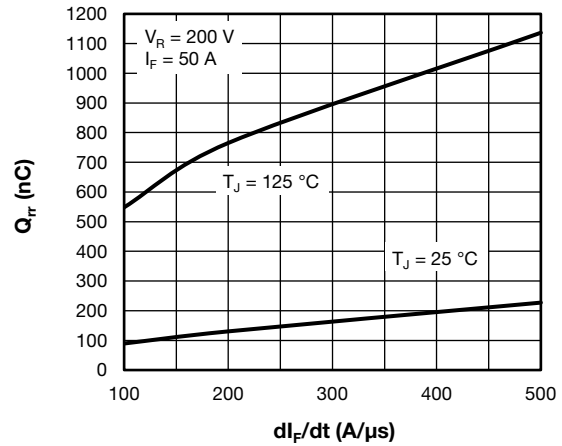


Fig. 8 - Reverse Recovery Charge vs. di_F/dt

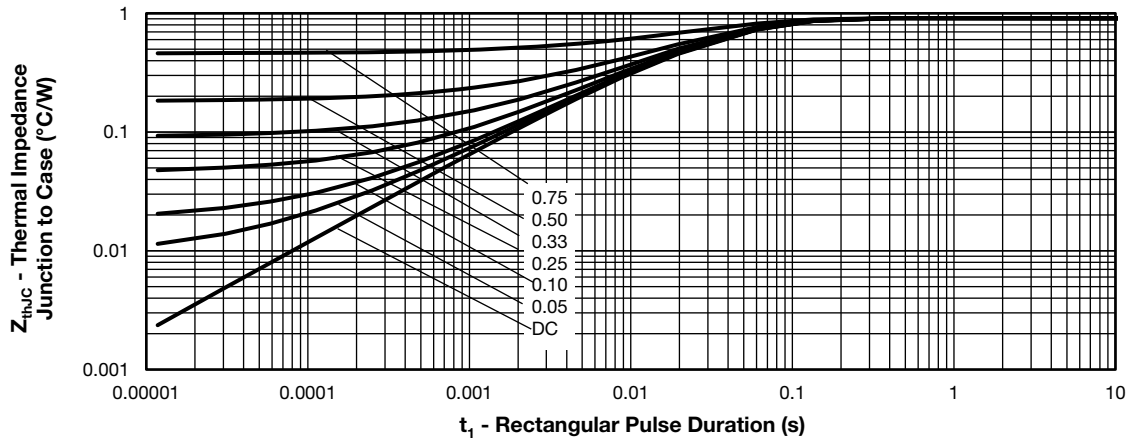


Fig. 9 - Maximum Thermal Impedance Junction-to-Case Characteristics (Per Diode)

ORDERING INFORMATION TABLE

| | | | | | | | |
|-------------|------------|-----------|----------|-----------|----------|----------|-----------|
| Device code | VS- | UF | H | 60 | B | A | 65 |
| | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |

- 1** - Vishay Semiconductors product
- 2** - Ultra fast rectifier
- 3** - Hyper fast FRED Pt[®] diffused
- 4** - Current rating (60 = 60 A)
- 5** - Circuit configuration:
B = Single phase bridge
- 6** - Package indicator:
A = SOT-227, standard insulated base
- 7** - Voltage rating (65 = 650 V)

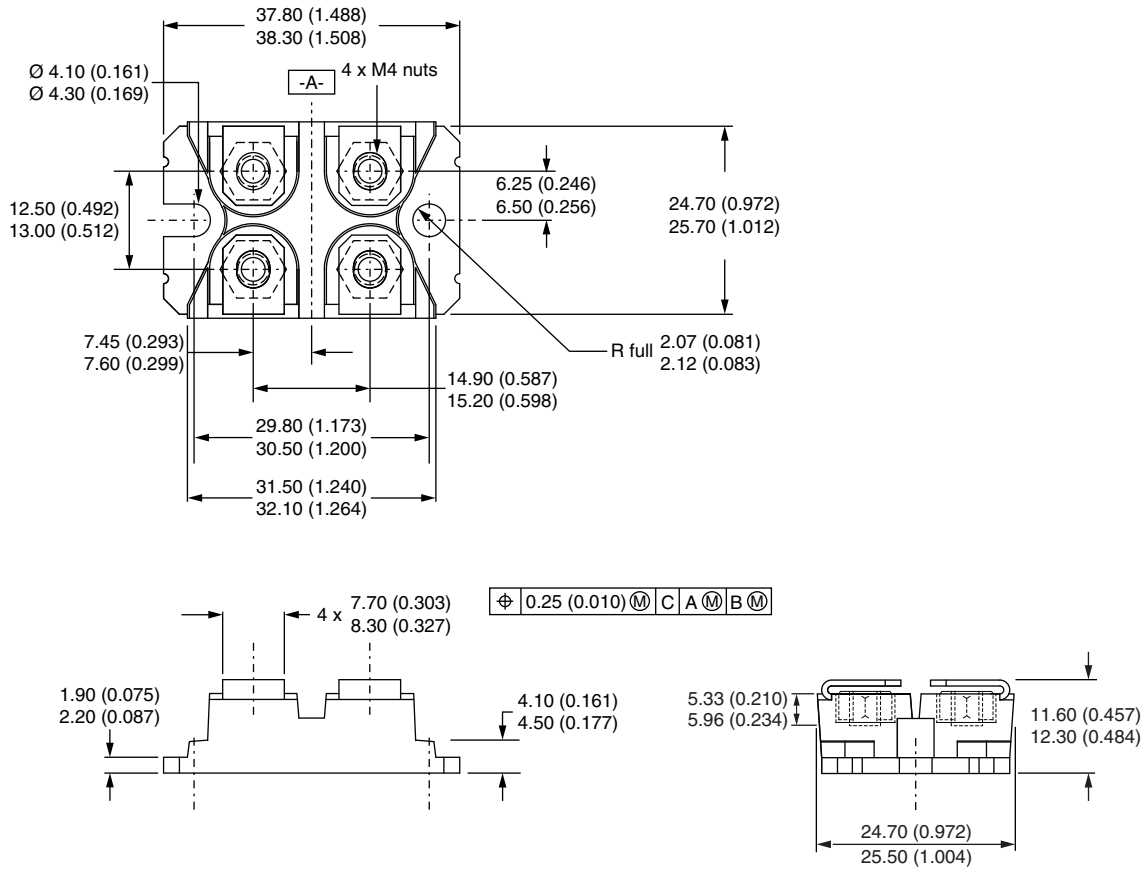
| CIRCUIT CONFIGURATION | | |
|-----------------------|----------------------------|-----------------|
| CIRCUIT | CIRCUIT CONFIGURATION CODE | CIRCUIT DRAWING |
| Single phase bridge | B | |

| 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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