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RHRG1560CC_F085 15A, 600V Hyperfast Rectifier

Features

- High Speed Switching ($t_{rr}=26\text{ns(Typ.)}$ @ $I_F=15\text{A}$)
- Low Forward Voltage($V_F=1.86\text{V(Typ.)}$ @ $I_F=15\text{A}$)
- Avalanche Energy Rated
- AEC-Q101 Qualified

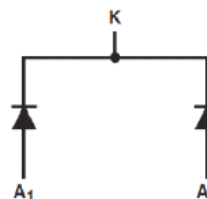
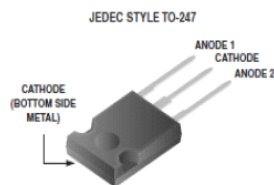
Applications

- Switching Power Supply
- Power Switching Circuits
- Automotive and General Purpose

Max Ratings (600V, 15A)

The RHRG1560CC_F085 is an Hyperfast™ diode with soft recovery characteristics ($t_{rr} < 55\text{ns}$). It has half the recovery time of ultrafast diode and is of silicon nitride passivated ion-implanted epitaxial planar construction. This device is intended for use as a freewheeling/clamping diode and rectifier in a variety of automotive switching power supplies and other power switching automotive applications. Its low stored charge and hyperfast soft recovery minimize ringing and electrical noise in many power switching circuits, thus reducing power loss in the switching transistors.

Pin Assignments



Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Ratings | Units |
|----------------|--|--------------|------------------|
| V_{RRM} | Peak Repetitive Reverse Voltage | 600 | V |
| V_{RWM} | Working Peak Reverse Voltage | 600 | V |
| V_R | DC Blocking Voltage | 600 | V |
| $I_{F(AV)}$ | Average Rectified Forward Current @ $T_C = 25^\circ\text{C}$ | 15 | A |
| I_{FSM} | Non-repetitive Peak Surge Current (Halfwave 1 Phase 50Hz) | 45 | A |
| E_{AVL} | Avalanche Energy (1A, 40mH) | 20 | mJ |
| T_J, T_{STG} | Operating Junction and Storage Temperature | - 55 to +175 | $^\circ\text{C}$ |

Thermal Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Max | Units |
|-----------------|---|------|--------------------|
| $R_{\theta JC}$ | Maximum Thermal Resistance, Junction to Case | 1.37 | $^\circ\text{C/W}$ |
| $R_{\theta JA}$ | Maximum Thermal Resistance, Junction to Ambient | 45 | $^\circ\text{C/W}$ |

Package Marking and Ordering Information

| Device Marking | Device | Package | Tube | Quantity |
|----------------|-----------------|---------|------|----------|
| RHRG1560CC | RHRG1560CC_F085 | TO-247 | - | 30 |

Electrical Characteristics T_C = 25°C unless otherwise noted

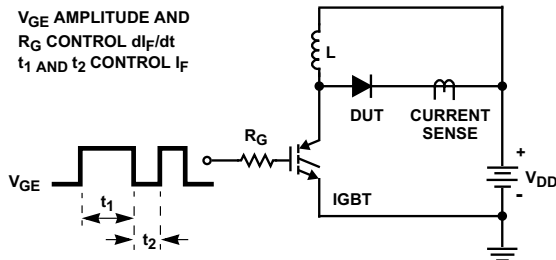
| Symbol | Parameter | Conditions | Min. | Typ. | Max | Units | |
|------------------------------|-------------------------------|--|--|------------------------|------|-------|----|
| I _R | Instantaneous Reverse Current | V _R = 600V | T _C = 25 °C | - | - | 100 | uA |
| | | | T _C = 175 °C | - | - | 1000 | uA |
| V _{FM} ¹ | Instantaneous Forward Voltage | I _F = 15A | T _C = 25 °C | - | 1.86 | 2.3 | V |
| | | | T _C = 175 °C | - | 1.28 | 1.6 | V |
| t _{rr} ² | Reverse Recovery Time | I _F = 1A, di/dt = 100A/μs, V _{CC} = 390V | T _C = 25 °C | - | 25 | 50 | ns |
| | | | I _F = 15A, di/dt = 100A/μs, V _{CC} = 390V | T _C = 25 °C | - | 26 | 55 |
| | | | T _C = 175 °C | - | 137 | - | ns |
| t _a | Reverse Recovery Time | I _F = 15A, di/dt = 100A/μs, V _{CC} = 390V | T _C = 25 °C | - | 15 | - | ns |
| t _b | Reverse Recovery Time | | | - | 11 | - | ns |
| Q _{rr} | Reverse Recovery Charge | | | - | 21 | - | nC |

Notes:

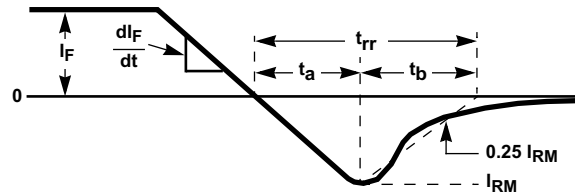
1. Pulse : Test Pulse width = 300μs, Duty Cycle = 2%
2. Guaranteed by design

Test Circuit and Waveforms

t_{rr} Test Circuit

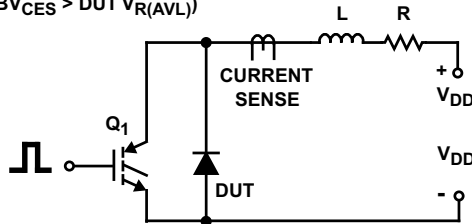


t_{rr} Waveforms and Definitions

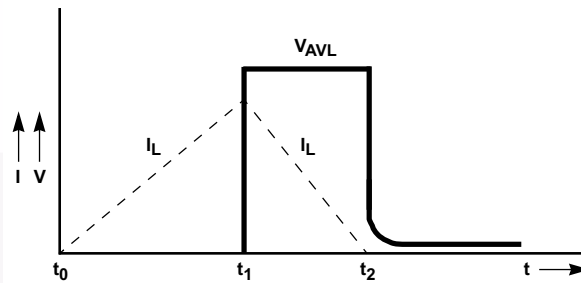


Avalanche Energy Test Circuit

I = 1A
 L = 40mH
 R < 0.1Ω
 $E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$
 Q₁ = IGBT (BV_{CES} > DUT V_{R(AVL)})



Avalanche Current and Voltage Waveforms



Typical Performance Characteristics

Figure 1. Typical Forward Voltage Drop vs. Forward Current

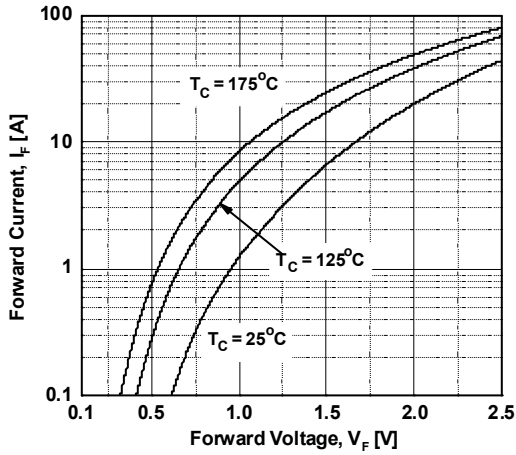


Figure 3. Typical Junction Capacitance

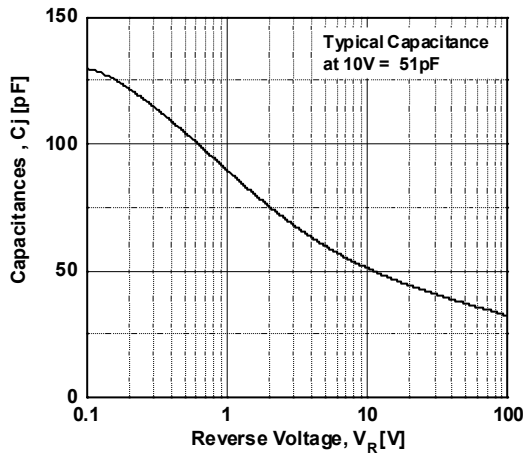


Figure 5. Typical Reverse Recovery Current vs. di/dt

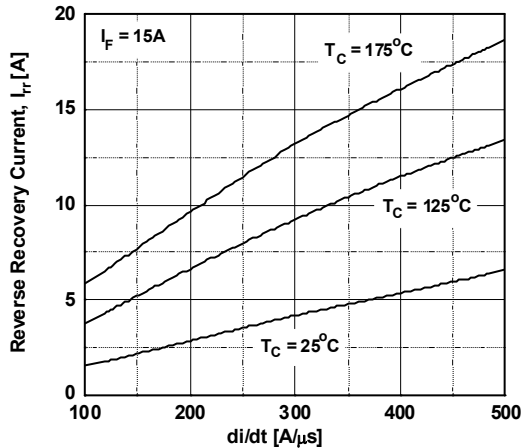


Figure 2. Typical Reverse Current vs. Reverse Voltage

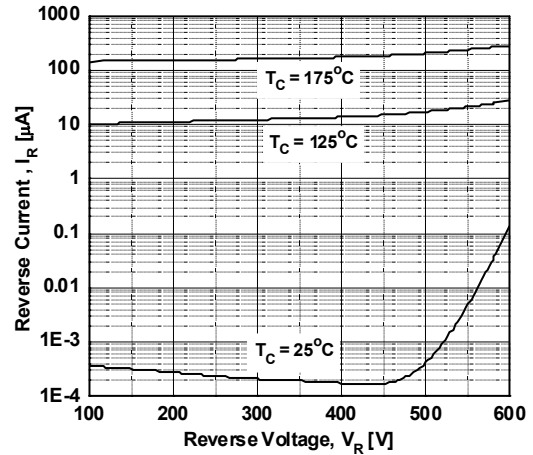


Figure 4. Typical Reverse Recovery Time vs. di/dt

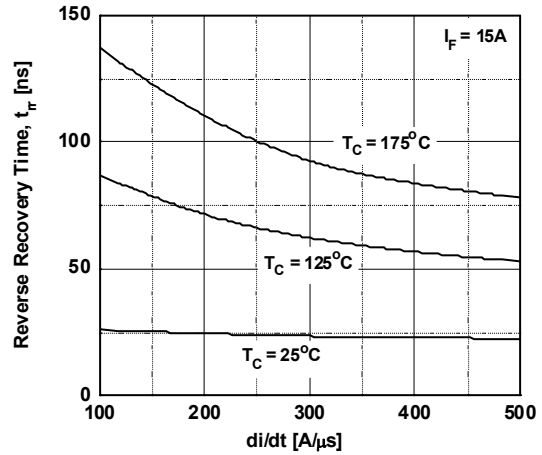
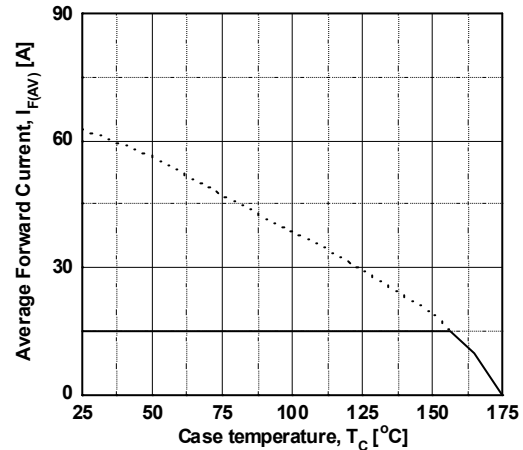


Figure 6. Forward Current Derating Curve



Typical Performance Characteristics (Continued)

Figure 7. Reverse Recovery Charge

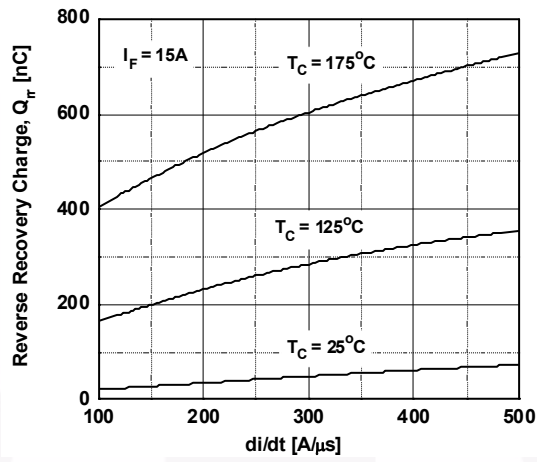
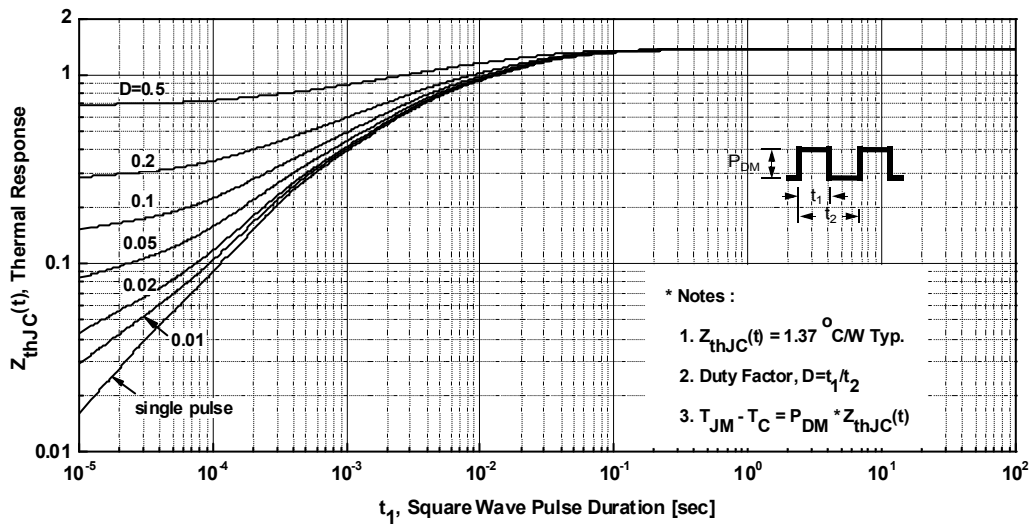
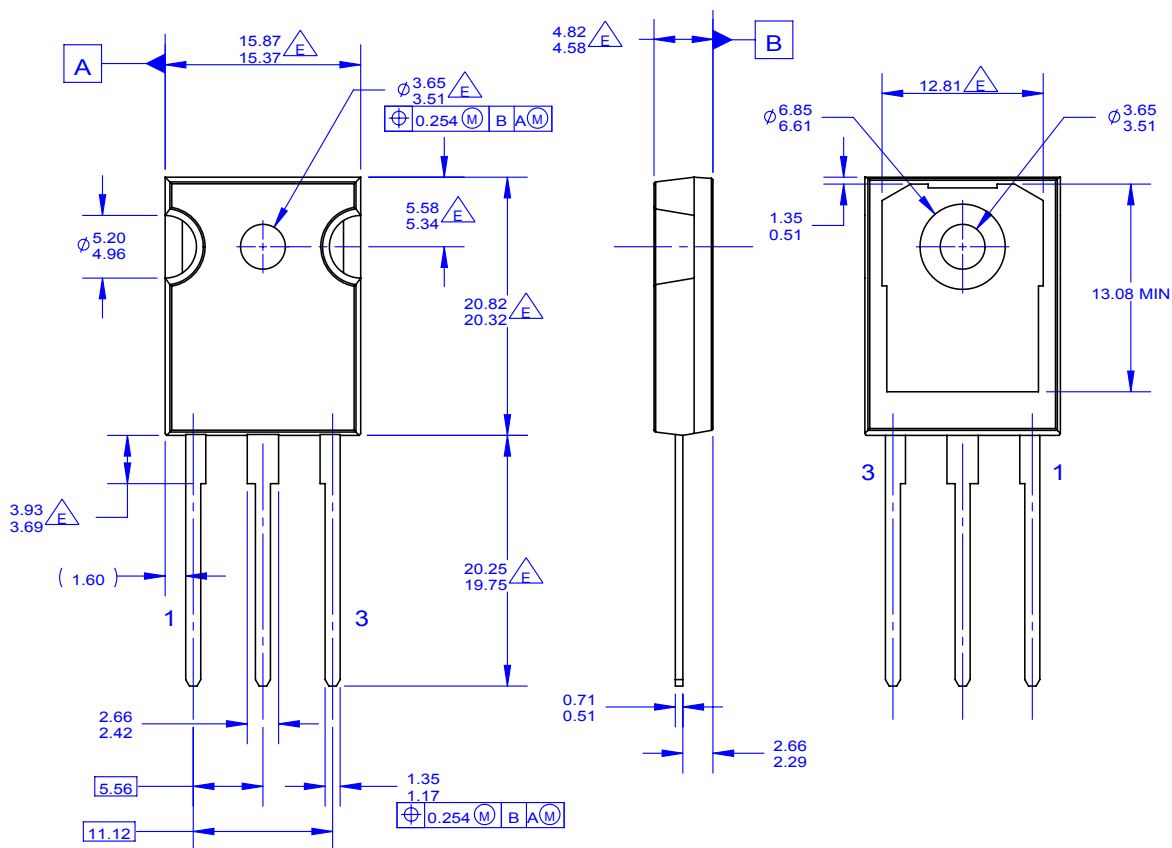


Figure 8. Transient Thermal Response Curve



Mechanical Dimensions

TO-247-3L



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