



ON Semiconductor®

# RHRG1560CC-F085 15A, 600V Hyperfast Rectifier

## 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.

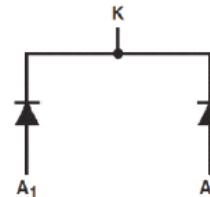
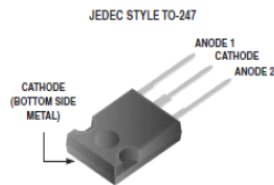
## Features

- 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

## 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

RHRG1560CC-F085 15A, 600V Hyperfast Rectifier

## Electrical Characteristics T<sub>C</sub> = 25°C unless otherwise noted

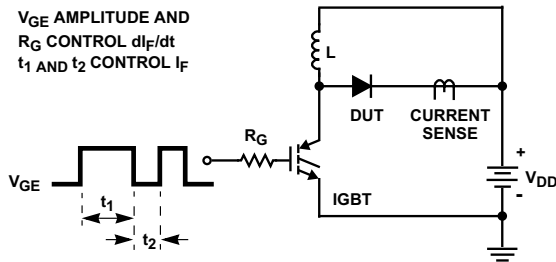
Symbol	Parameter	Conditions	Min.	Typ.	Max	Units	
I <sub>R</sub>	Instantaneous Reverse Current	V <sub>R</sub> = 600V	T <sub>C</sub> = 25 °C	-	-	100	uA
			T <sub>C</sub> = 175 °C	-	-	1000	uA
V <sub>FM</sub> <sup>1</sup>	Instantaneous Forward Voltage	I <sub>F</sub> = 15A	T <sub>C</sub> = 25 °C	-	1.86	2.3	V
			T <sub>C</sub> = 175 °C	-	1.28	1.6	V
t <sub>rr</sub> <sup>2</sup>	Reverse Recovery Time	I <sub>F</sub> = 1A, di/dt = 100A/μs, V <sub>CC</sub> = 390V	T <sub>C</sub> = 25 °C	-	25	50	ns
			I <sub>F</sub> = 15A, di/dt = 100A/μs, V <sub>CC</sub> = 390V	T <sub>C</sub> = 25 °C	-	26	55
			T <sub>C</sub> = 175 °C	-	137	-	ns
t <sub>a</sub>	Reverse Recovery Time	I <sub>F</sub> = 15A, di/dt = 100A/μs, V <sub>CC</sub> = 390V	T <sub>C</sub> = 25 °C	-	15	-	ns
t <sub>b</sub>	Reverse Recovery Time			-	11	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge			-	21	-	nC

### Notes:

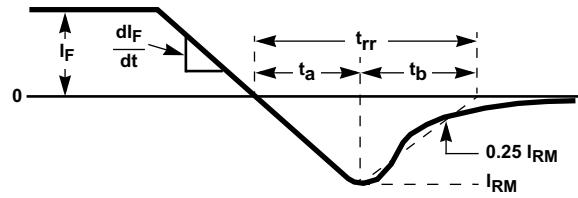
1. Pulse : Test Pulse width = 300μs, Duty Cycle = 2%
2. Guaranteed by design

## Test Circuit and Waveforms

### t<sub>rr</sub> Test Circuit

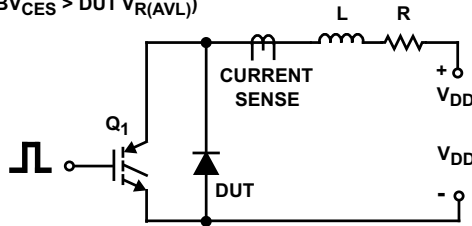


### t<sub>rr</sub> Waveforms and Definitions

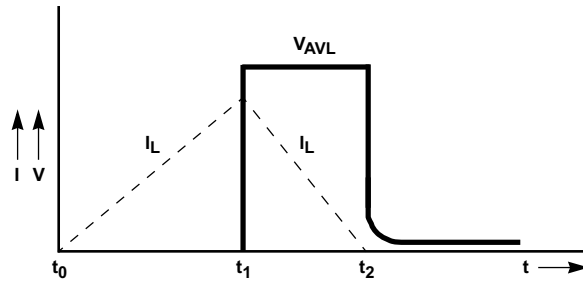


### Avalanche Energy Test Circuit

I = 1A  
L = 40mH  
R < 0.1Ω  
E<sub>AVL</sub> = 1/2LI<sup>2</sup> [V<sub>R(AVL)</sub>/(V<sub>R(AVL)</sub> - V<sub>DD</sub>)]  
Q<sub>1</sub> = IGBT (BV<sub>CES</sub> > DUT V<sub>R(AVL)</sub>)



### Avalanche Current and Voltage Waveforms



## Typical Performance Characteristics

Figure 1. Typical Forward Voltage Drop vs. Forward Current

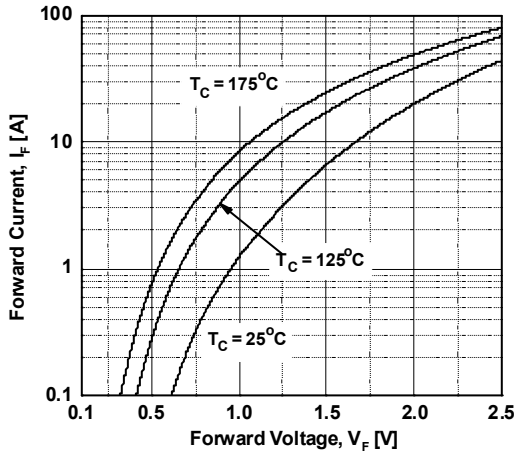


Figure 3. Typical Junction Capacitance

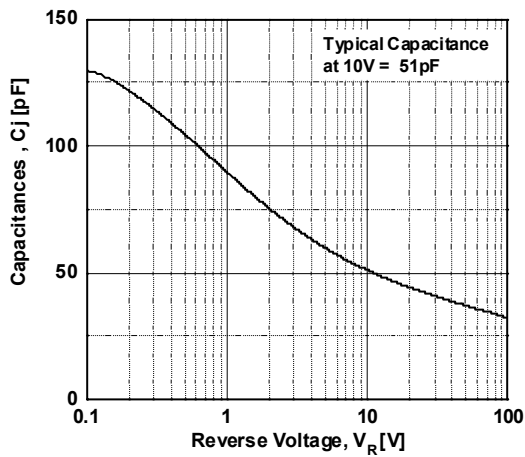


Figure 5. Typical Reverse Recovery Current vs. di/dt

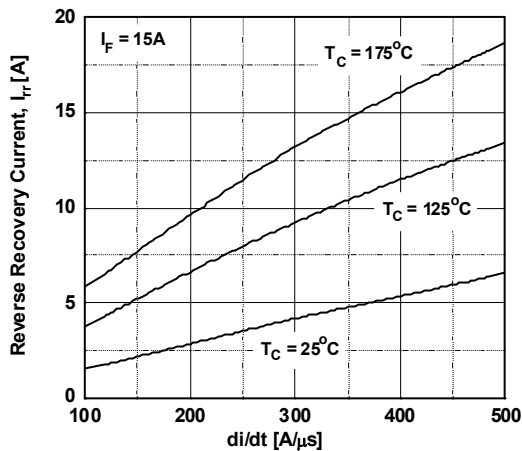


Figure 2. Typical Reverse Current vs. Reverse Voltage

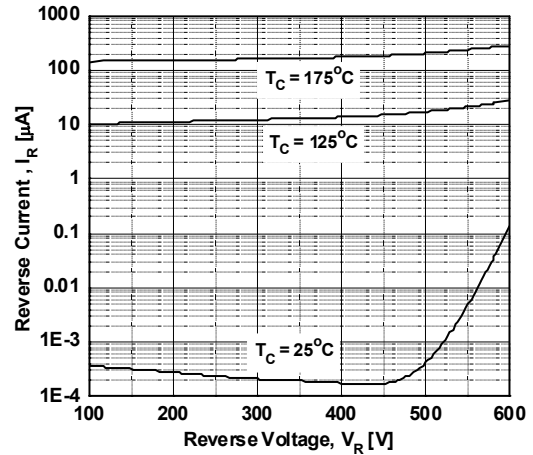


Figure 4. Typical Reverse Recovery Time vs. di/dt

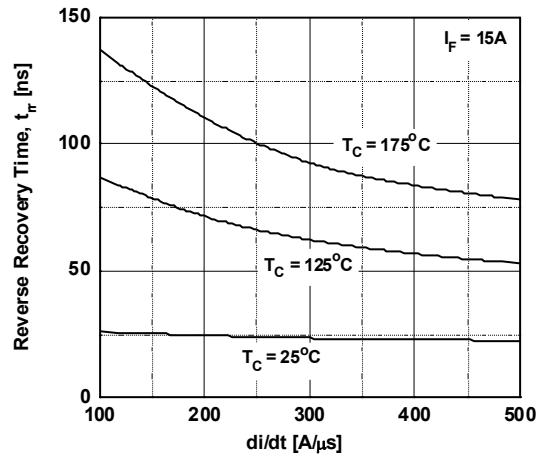
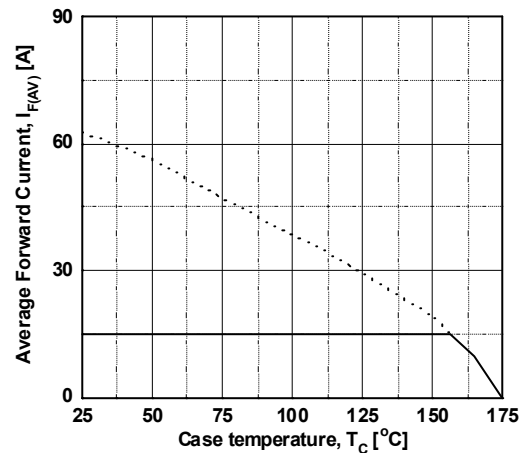


Figure 6. Forward Current Derating Curve



Typical Performance Characteristics (Continued)

Figure 7. Reverse Recovery Charge

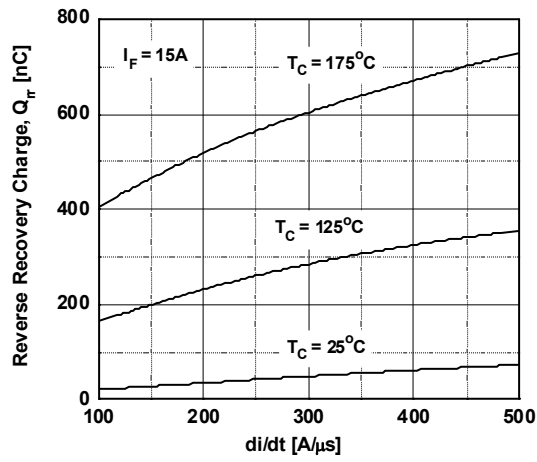
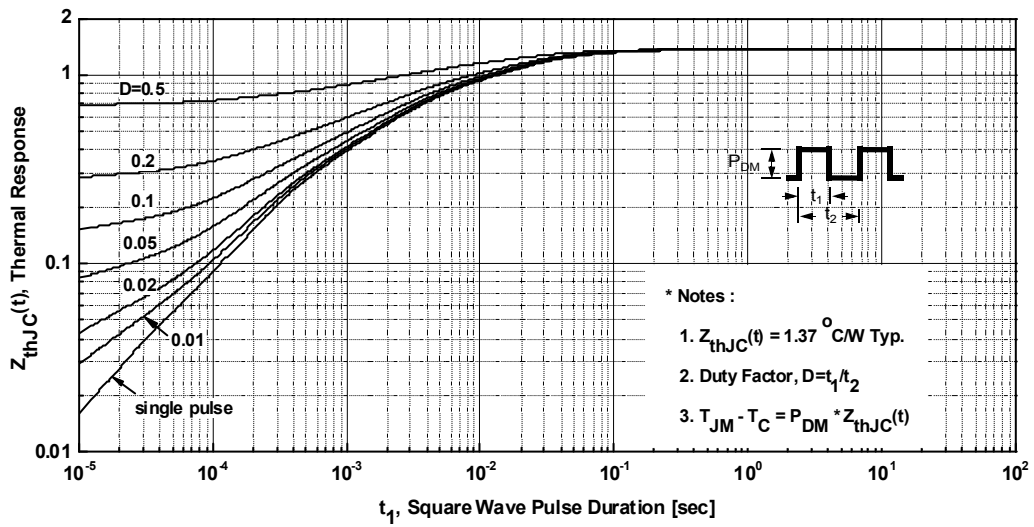
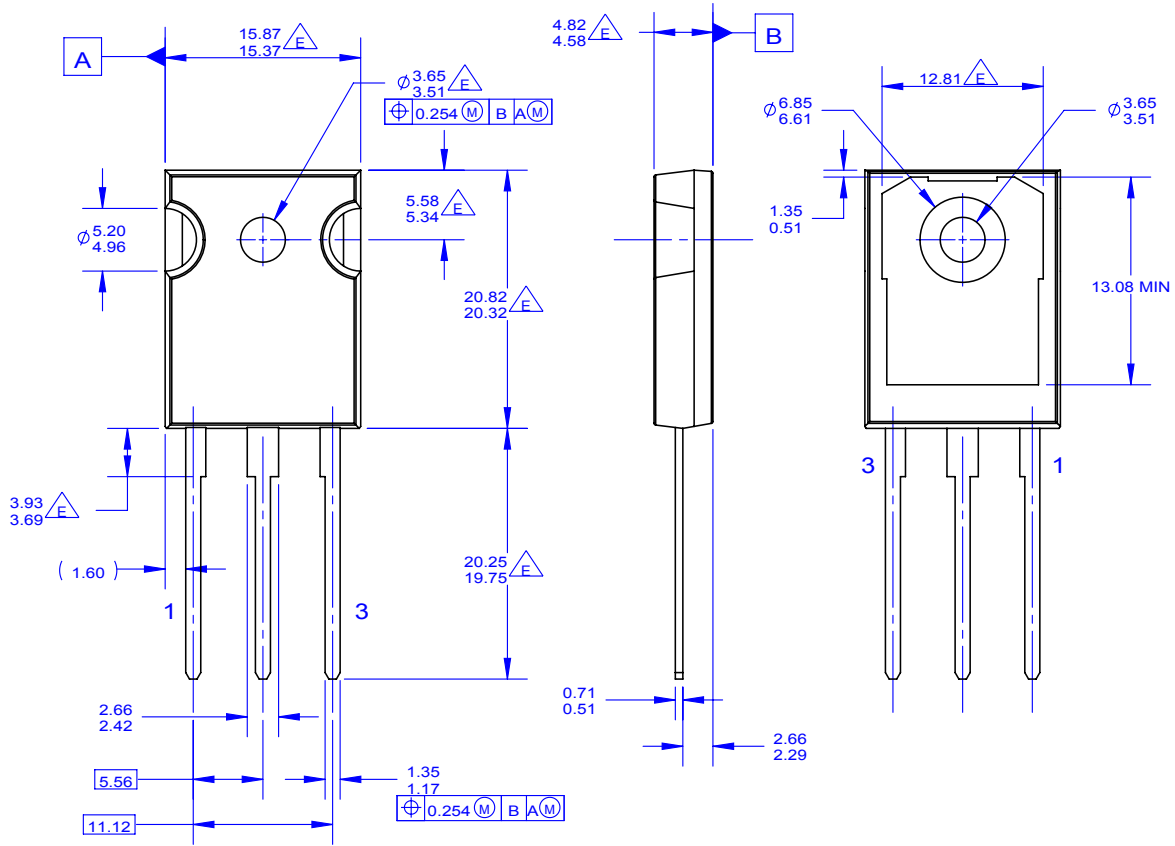


Figure 8. Transient Thermal Response Curve



Mechanical Dimensions

TO-247-3L



- NOTES: UNLESS OTHERWISE SPECIFIED.
- A. PACKAGE REFERENCE: JEDEC TO-247, ISSUE E, VARIATION AB, DATED JUNE, 2004.
  - B. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.
  - C. ALL DIMENSIONS ARE IN MILLIMETERS.
  - D. DRAWING CONFORMS TO ASME Y14.5 - 1994
- $\triangle E$  DOES NOT COMPLY JEDEC STANDARD VALUE  
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Dimensions in Millimeters

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