15 A, 600 V Hyperfast Rectifier

RHRG1560CC-F085

ON Semiconductor®

www.onsemi.com



TO−247−3LD
CASE 340CK

MARKING DIAGRAM



RHRG1560C	= Specific Device Code
$Y	= ON Semiconductor Logo
&Z	= Assembly Lot Code
&3	= Numeric Date Code
&K	= Assembly Location

ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

Max Ratings (600 V, 15 A)

The RHRG1560CC−F085 is an Hyperfast diode with soft recovery characteristics (t_{rr} < 55 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 ns(Typ.) @ I_F = 15 A)
- Low Forward Voltage (V_F = 1.86 V(Typ.) @ I_F = 15 A)
- Avalanche Energy Rated
- AEC−Q101 Qualified and PPAP Capable
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

Applications

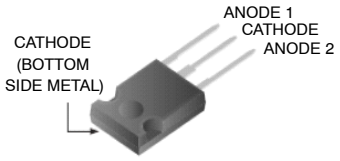
- Switching Power Supply
- Power Switching Circuits
- Automotive and General Purpose

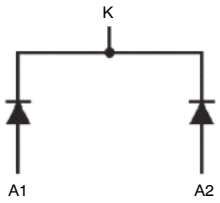
© Semiconductor Components Industries, LLC, 2014

Downloaded from Arrow.com.

PIN ASSIGNMENTS

JEDEC STYLE T0−247





ABSOLUTE MAXIMUM RATINGS (T_C = 25°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°C	15	A
I_{FSM}	Non−repetitive Peak Surge Current (Halfwave 1 Phase 50 Hz)	45	A
E_{AVL}	Avalanche Energy (1 A, 40 mH)	20	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature	− 55 to +175	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS (T_C = 25°C Unless Otherwise Noted)

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

PACKAGE MARKING AND ORDIRING INFORMATION

Device Marking	Device	Package	Tube	Quantity
RHRG1560C	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 = 600 V	T_C = 25°C	−	−	100	μA
			T_C = 175°C	−	−	1000	μA
V_{FM} (Note 1)	Instantaneous Forward Voltage	I_F = 15 A	T_C = 25°C	−	1.86	2.3	V
			T_C = 175°C	−	1.28	1.6	V
t_{rr} (Note 2)	Reverse Recovery Time	I_F =1 A, di/dt = 100 A/μs, V_{CC}= 390 V	T_C = 25°C	−	25	50	ns
		I_F =15 A, di/dt = 100 A/μs, V_{CC}= 390 V	T_C = 25°C	−	26	55	ns
			T_C = 175°C	−	137	−	ns
t_a	Reverse Recovery Time	I_F =15 A, di/dt = 100 A/μs, V_{CC}= 390 V	T_C = 25°C	−	15	−	ns
t_b				−	11	−	ns
Q_{rr}	Reverse Recovery Charge			−	21	−	nC

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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

Downloaded from Arrow.com.

TEST CIRCUIT AND WAVEFORMS

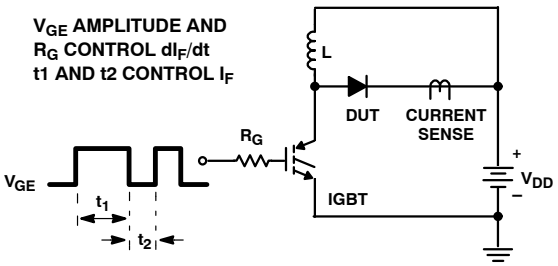


Figure 1. t_{rr} Test Circuit

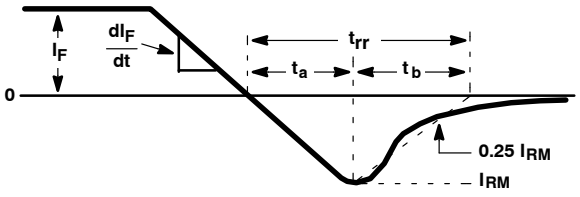


Figure 2. t_{rr} Waveforms and Definitions

I = 1 A
L = 40 mH
R < 0.1 Ω
$E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$
Q_1 = IGBT (BV_{CES} > DUT $V_{R(AVL)}$)

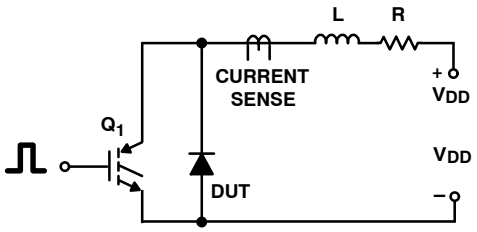


Figure 3. Avalanche Energy Test Circuit

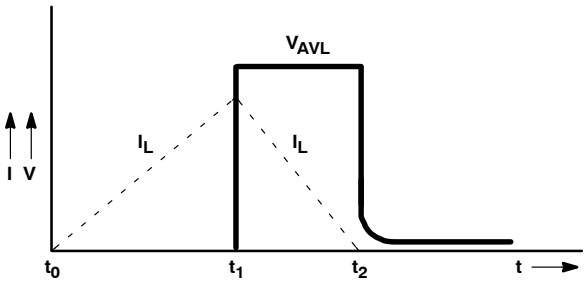


Figure 4. Avalanche Current and Voltage Waveforms

Downloaded from Arrow.com.

TYPICAL PERFORMANCE CHARACTERISTICS

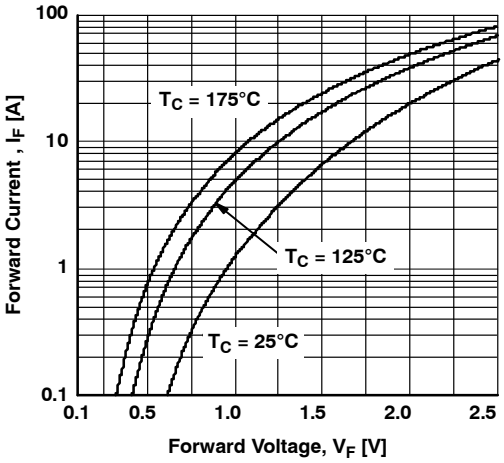


Figure 5. Typical Forward Voltage Drop vs. Forward Current

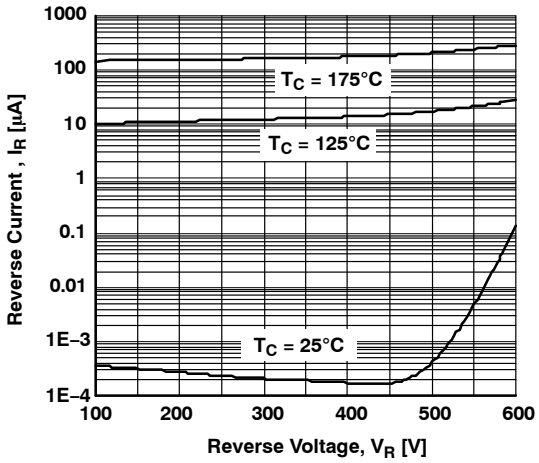


Figure 6. Typical Reverse Current vs. Reverse Voltage

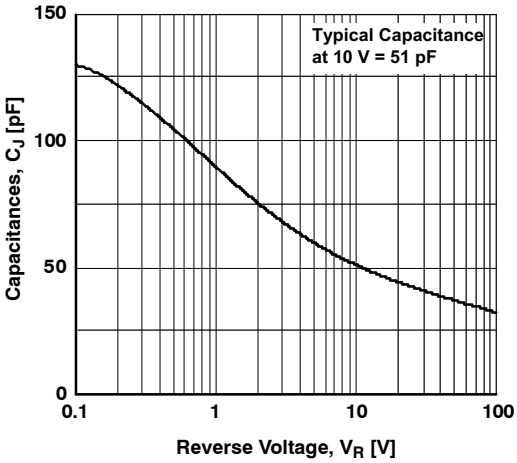


Figure 7. Typical Junction Capacitance

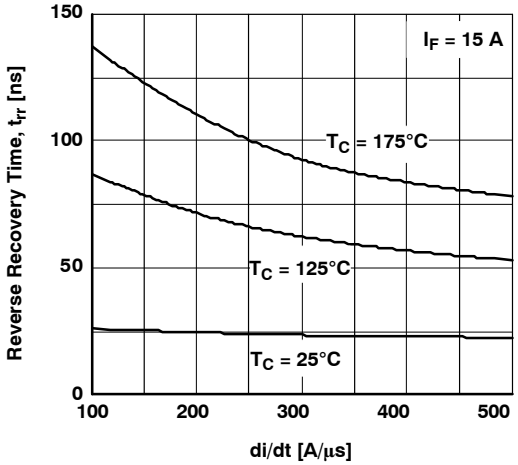


Figure 8. Typical Reverse Recovery Time vs. di/dt

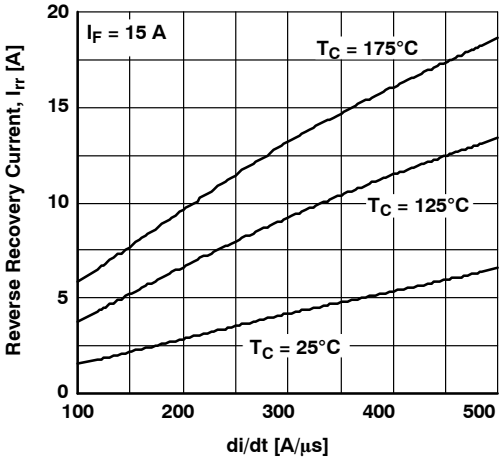


Figure 9. Typical Reverse Recovery Current vs. di/dt

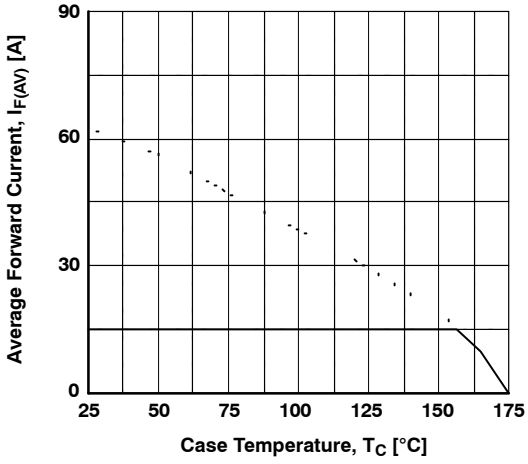


Figure 10. Forward Current Derating Curve

Downloaded from Arrow.com.

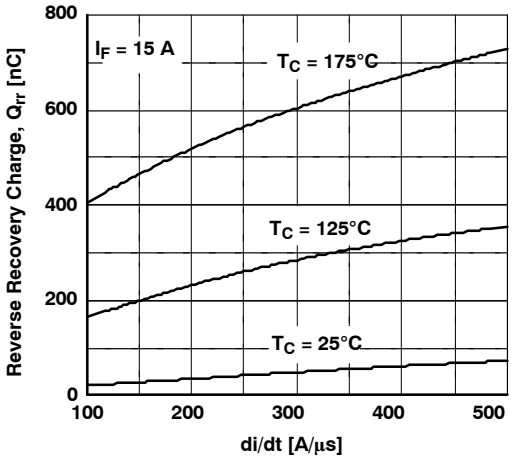


Figure 11. Reverse Recovery Charge

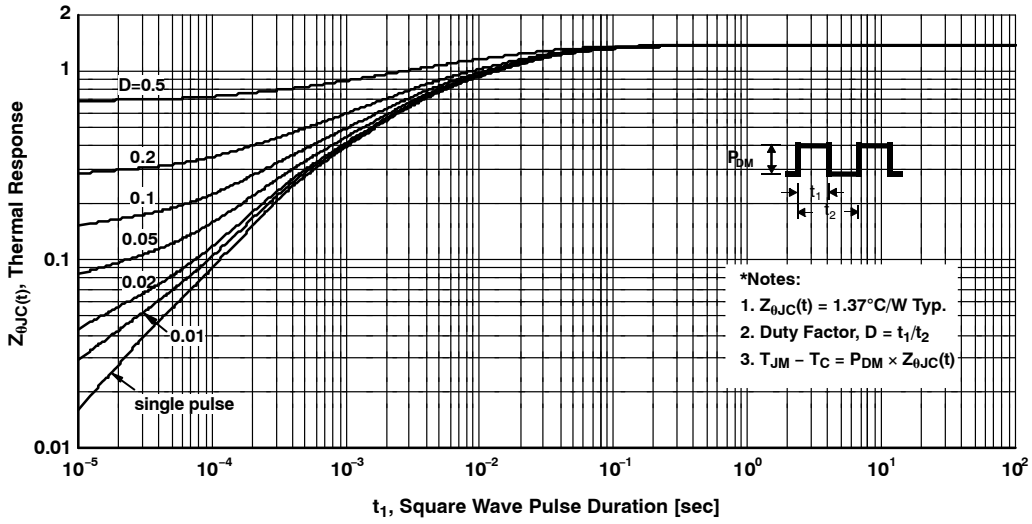


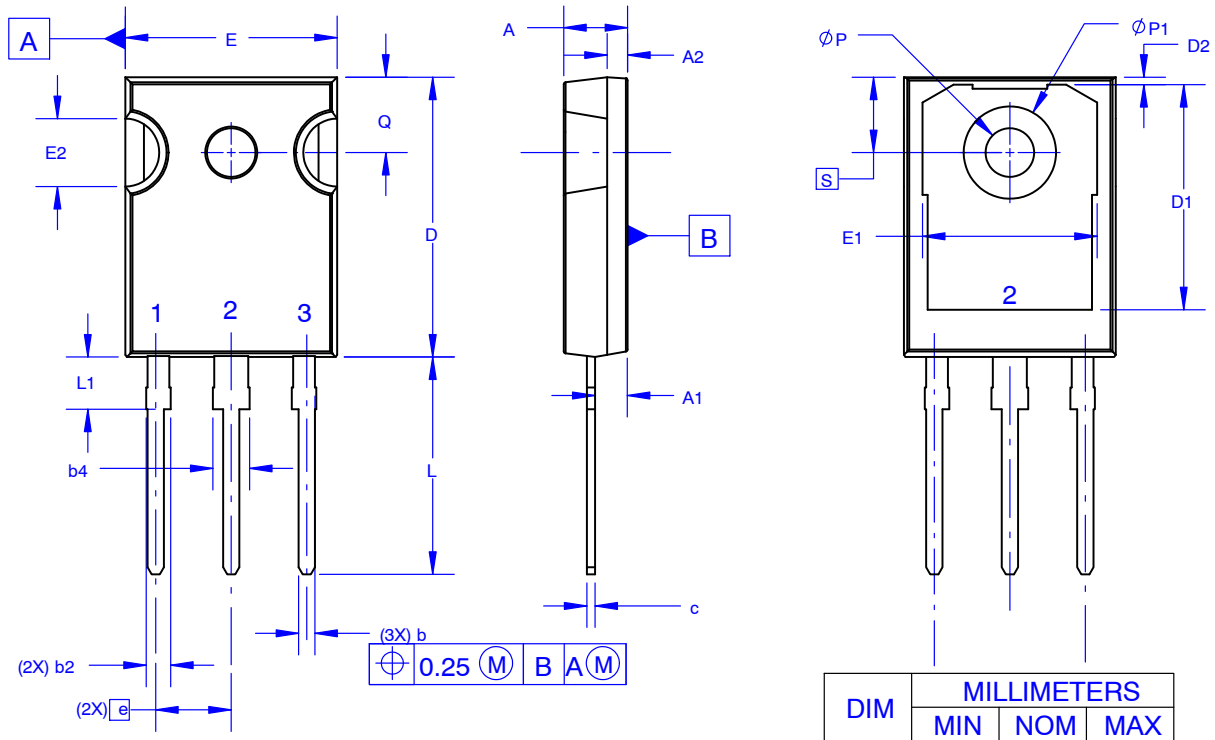
Figure 12. Transient Thermal Response Curve

Downloaded from Arrow.com.

TO−247−3LD SHORT LEAD

CASE 340CK
ISSUE A

DATE 31 JAN 2019

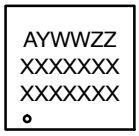


DIM	MILLIMETERS		
	MIN	NOM	MAX
A	4.58	4.70	4.82
A1	2.20	2.40	2.60
A2	1.40	1.50	1.60
b	1.17	1.26	1.35
b2	1.53	1.65	1.77
b4	2.42	2.54	2.66
c	0.51	0.61	0.71
D	20.32	20.57	20.82
D1	13.08	~	~
D2	0.51	0.93	1.35
E	15.37	15.62	15.87
E1	12.81	~	~
E2	4.96	5.08	5.20
e	~	5.56	~
L	15.75	16.00	16.25
L1	3.69	3.81	3.93
ØP	3.51	3.58	3.65
ØP1	6.60	6.80	7.00
Q	5.34	5.46	5.58
S	5.34	5.46	5.58

NOTES: UNLESS OTHERWISE SPECIFIED.

A. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.
B. ALL DIMENSIONS ARE IN MILLIMETERS.
C. DRAWING CONFORMS TO ASME Y14.5 - 2009.
D. DIMENSION A1 TO BE MEASURED IN THE REGION DEFINED BY L1.
E. LEAD FINISH IS UNCONTROLLED IN THE REGION DEFINED BY L1.

GENERIC MARKING DIAGRAM*



XXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
ZZ = Assembly Lot Code

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.

DOCUMENT NUMBER:	**98AON13851G**	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red.
DESCRIPTION:	**TO−247−3LD SHORT LEAD**	**PAGE 1 OF 1**

onsemi and ONSEMI are trademarks of Semiconductor Components Industries, LLC dba **onsemi** or its subsidiaries in the United States and/or other countries. **onsemi** reserves the right to make changes without further notice to any products herein. **onsemi** makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. **onsemi** does not convey any license under its patent rights nor the rights of others.

© Semiconductor Components Industries, LLC, 2016

Downloaded from Arrow.com.

onsemi, ONSEMI , and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent−Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as−is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at www.onsemi.com/support/sales

◊

Downloaded from Arrow.com.