Hyperfast Dual Diode
30 A, 400 V - 600 V

RHRG1560CC, RHRG1540CC

Description

The RHRG1560CC, RHRG1540CC is a hyperfast dual diode with soft recovery characteristics. It has the half recovery time of ultrafast diodes and is silicon nitride passivated ionimplanted epitaxial planar construction.

These devices are intended to be used as freewheeling/clamping diodes and diodes in a variety of switching power supplies and other power switching applications. Their low stored charge and hyperfast soft recovery minimize ringing and electrical noise in many power switching circuits reducing power loss in the switching transistors.

Features

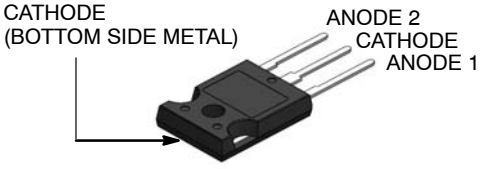
- Hyperfast Recovery t_{rr} = 40 ns (@ I_F = 15 A)
- Max Forward Voltage, V_F = 2.1 V (@ T_C = 25°C)
- 400 V, 600 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- These Devices are Pb−Free and are RoHS Compliant

Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

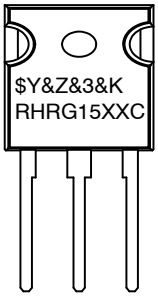
ON Semiconductor®

www.onsemi.com

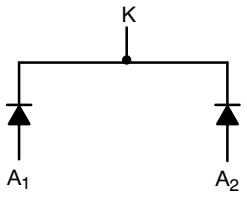


TO−247−3LD
CASE 340CK

MARKING DIAGRAM



$Y	= ON Semiconductor Logo
&Z	= Assembly Plant Code
&3	= Numeric Date Code
&K	= Lot Code
RHRG15XXC	= Specific Device Code
XX	= 60, 40



ORDERING INFORMATION

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

© Semiconductor Components Industries, LLC, 2017

ABSOLUTE MAXIMUM RATINGS (T_J = 25°C, unless otherwise specified) (Per Leg)

Description	Symbol	RHRG1560CC	RHRG1540CC	Unit
Peak Repetitive Reverse Voltage	V_{RRM}	600	400	V
Working Peak Reverse Voltage	V_{RWM}	600	400	V
DC Blocking Voltage	V_R	600	400	V
Average Rectified Forward Current (T_C = 140°C)	$I_{F(AV)}$	15	15	A
Repetitive Peak Surge Current (Square Wave, 20 kHz)	I_{FRM}	30	30	A
Non−repetitive Peak Surge Current (Halfwave, 1 Phase, 60 Hz)	I_{FSM}	200	200	A
Maximum Power Dissipation	P_D	100	100	W
Avalanche Energy (See Figures 10 and 11)	E_{AVL}	20	20	mJ
Operating and Storage Temperature	T_{STG}, T_J	−65 to 175	−65 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.

PACKAGE MARKING AND ORDERING INFORMATION

Part Number	Top Mark	Package	Shipping
RHRG1560CC	RHRG1560C	TO−247−3L	450 / Tube
RHRG1540CC	RHRG1540C	TO−247−3L	450 / Tube

ELECTRICAL SPECIFICATIONS (T_J = 25°C, unless otherwise specified) (Per Leg)

Characteristic	Symbol	Test Conditions	RHRG1560CC			RHRG1540CC			Unit
			Min	Typ	Max	Min	Typ	Max	Unit
Instantaneous Forward Voltage (Pulse Width = 300 μs, Duty Cycle = 2%)	V_F	I_F = 15 A	–	–	2.1	–	–	2.1	V
		I_F = 15 A, T_C = 150°C	–	–	1.7	–	–	1.7	V
Instantaneous Reverse Current	I_R	V_R = 400 V	–	–	–	–	–	100	μA
		V_R = 600 V	–	–	100	–	–	–	μA
		V_R = 400 V, T_C = 150°C	–	–	–	–	–	500	μA
		V_R = 600 V, T_C = 150°C	–	–	500	–	–	–	μA
Reverse Recovery Time (See Figure 9), Summation of ta + tb.	T_{rr}	I_F = 1 A, dI_F/dt = 100 A/μs	–	–	35	–	–	35	ns
		I_F = 15 A, dI_F/dt = 100 A/μs	–	–	40	–	–	40	ns
Time to Reach Peak Reverse Current (See Figure 9).	t_a	I_F = 15 A, dI_F/dt = 100 A/μs	–	20	–	–	20	–	ns
Time from Peak I_{RM} to Projected Zero Crossing of I_{RM} Based on a Straight Line from Peak I_{RM} through 25% of IRM (See Figure 9).	t_b	I_F = 15 A, dI_F/dt = 100 A/μs	–	15	–	–	15	–	ns
Reverse Recovery Charge	Q_{rr}	I_F = 15 A, dI_F/dt = 100 A/μs	–	40	–	–	40	–	nC
Junction Capacitance	C_J	V_R = 10 V, I_F = 0 A	–	60	–	–	60	–	pF
Thermal Resistance Junction to Case	$R_{\theta JC}$		–	–	1.5	–	–	1.5	°C/W

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.

TYPICAL PERFORMANCE CURVES

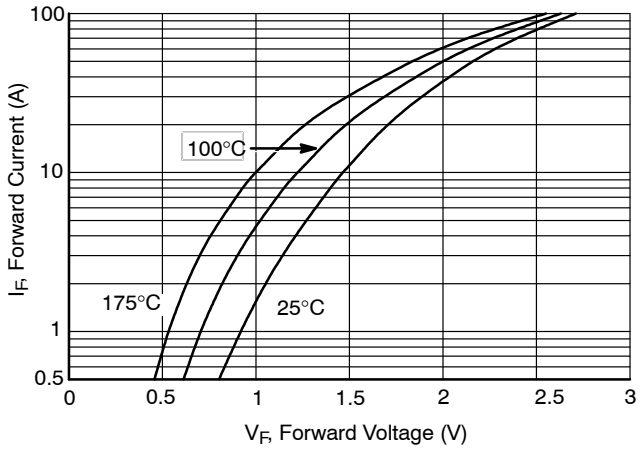


Figure 1. Forward Current vs. Forward Voltage

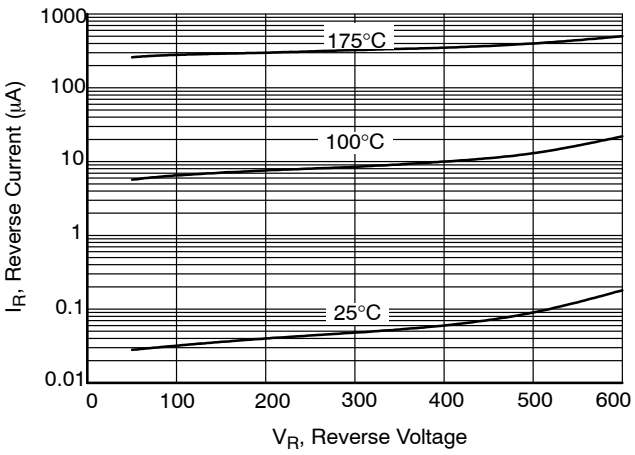


Figure 2. Reverse Current vs. Reverse Voltage

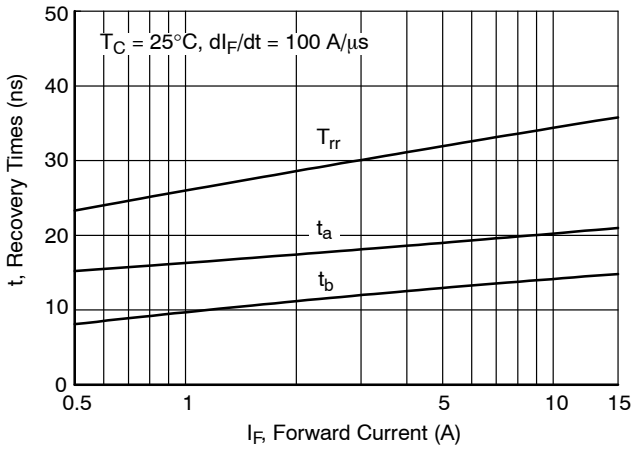


Figure 3. T_{rr}, t_a and t_b Curves vs. Forward Current

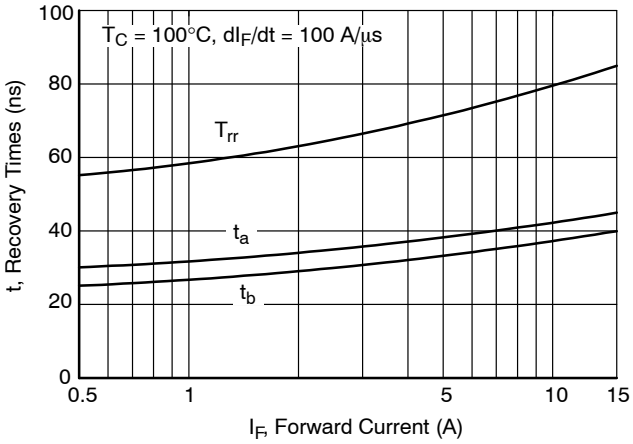


Figure 4. T_{rr}, t_a and t_b Curves vs. Forward Current

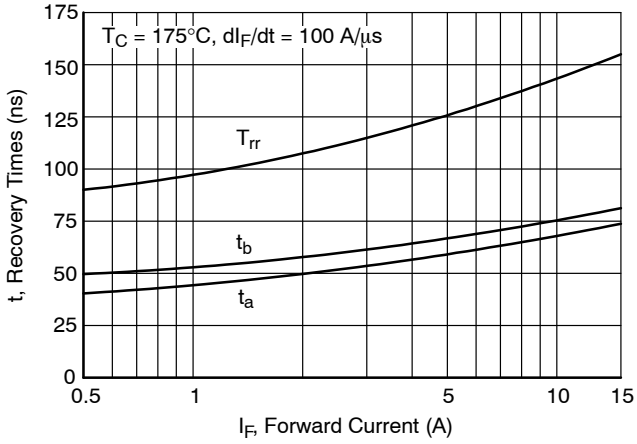


Figure 5. T_{rr}, t_a and t_b Curves vs. Forward Current

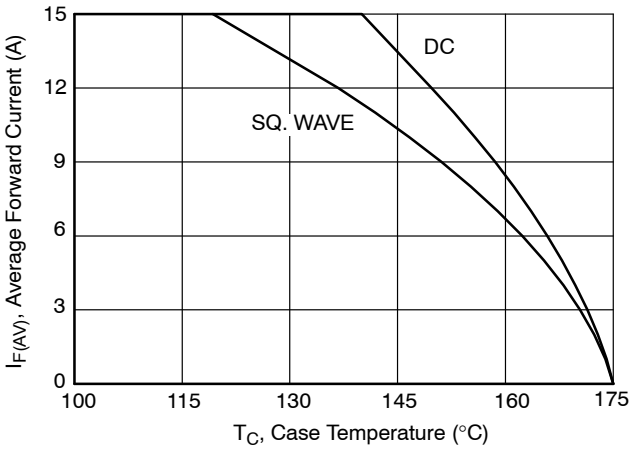


Figure 6. Current Derating Curve

TYPICAL PERFORMANCE CHARACTERISTICS (continued)

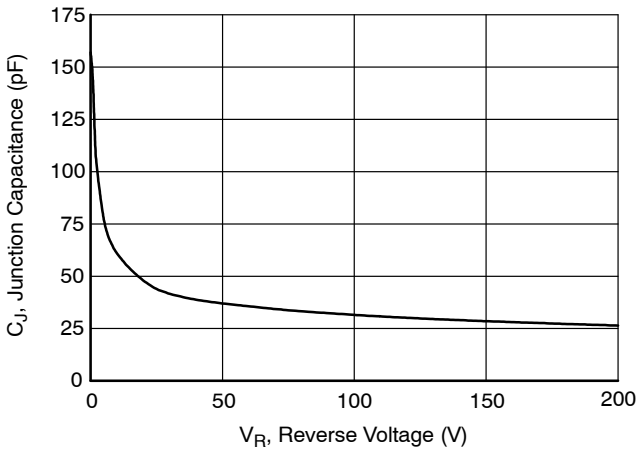


Figure 7. Junction Capacitance vs. Reverse Voltage

TEST CIRCUITS AND WAVEFORMS

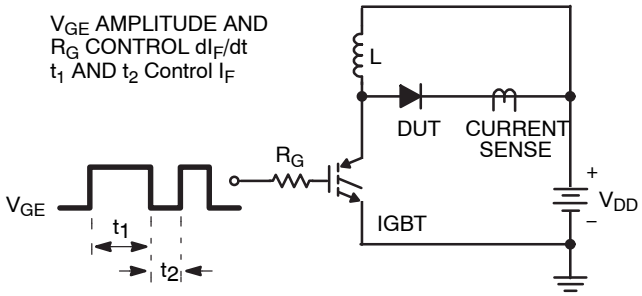


Figure 8. T_{rr} Test Circuit

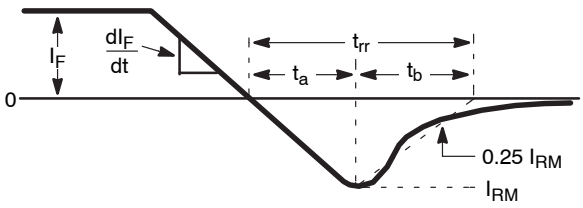


Figure 9. T_{rr} Waveforms and Definitions

I_{MAX} = 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 $V_{R(AVL)}$)

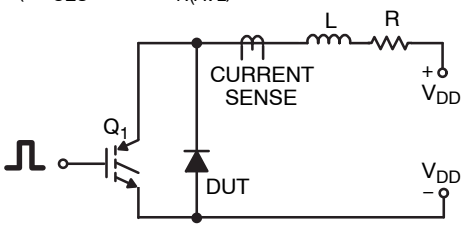


Figure 10. Avalanche Energy Test Circuit

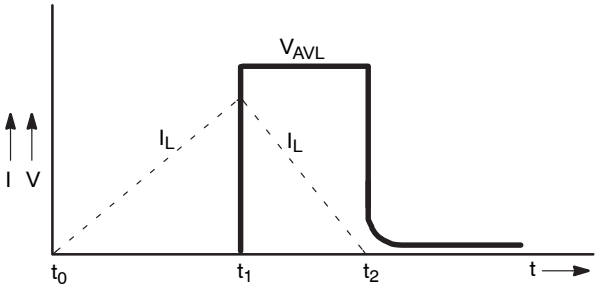
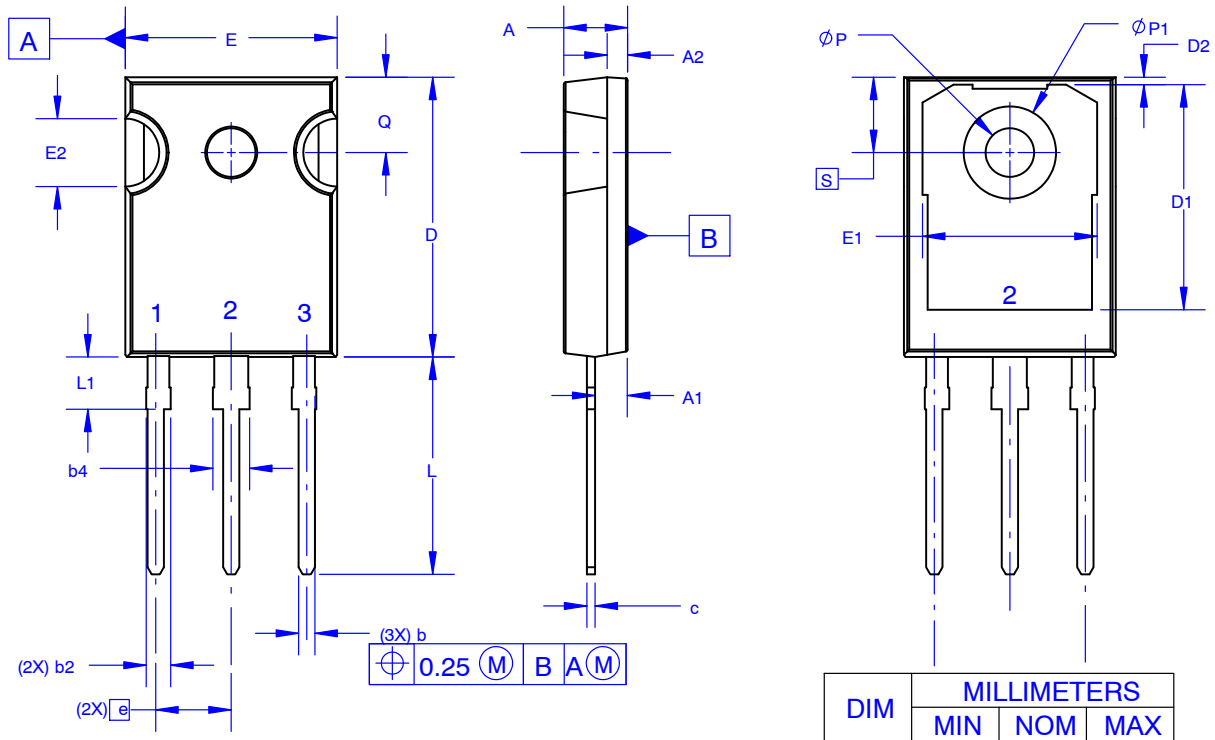


Figure 11. Avalanche Current and Voltage Waveforms

TO−247−3LD SHORT LEAD
CASE 340CK
ISSUE A

DATE 31 JAN 2019

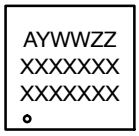


DIM	MILLIMETERS		
	MIN	NOM	MAX
A	4.58	4.70	4.82
A1	2.20	2.40	2.60
A2	1.40	1.50	1.60
b	1.17	1.26	1.35
b2	1.53	1.65	1.77
b4	2.42	2.54	2.66
c	0.51	0.61	0.71
D	20.32	20.57	20.82
D1	13.08	~	~
D2	0.51	0.93	1.35
E	15.37	15.62	15.87
E1	12.81	~	~
E2	4.96	5.08	5.20
e	~	5.56	~
L	15.75	16.00	16.25
L1	3.69	3.81	3.93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

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