15 A, 600 V Hyperfast Rectifier

RHRG1560CC-F085

ON Semiconductor®

www.onsemi.com

TO−247−3LD
CASE 340CK

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

MARKING DIAGRAM

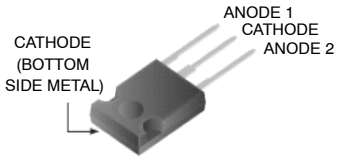
RHRG1560C	= Specific Device Code
$Y	= ON Semiconductor Logo
&Z	= Assembly Lot Code
&3	= Numeric Date Code
&K	= Assembly Location

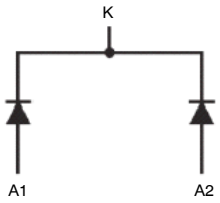
ORDERING INFORMATION

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

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.

TEST CIRCUIT AND WAVEFORMS

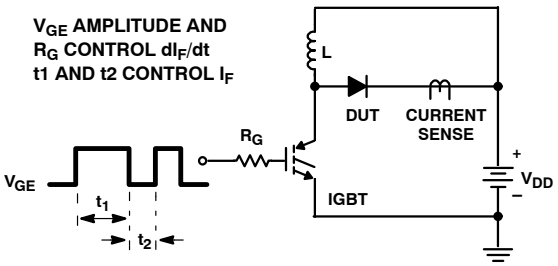


Figure 1. t_{rr} Test Circuit

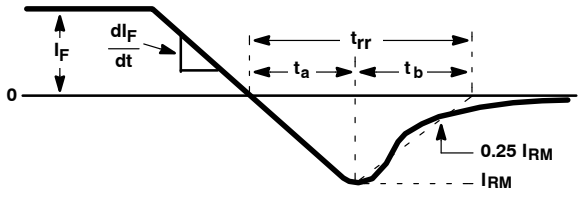


Figure 2. t_{rr} Waveforms and Definitions

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 $V_{R(AVL)}$)

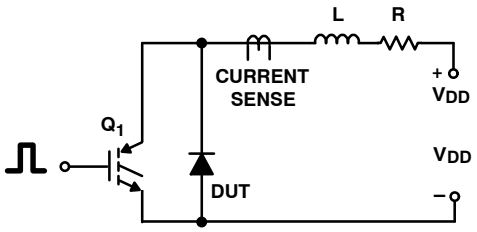


Figure 3. Avalanche Energy Test Circuit

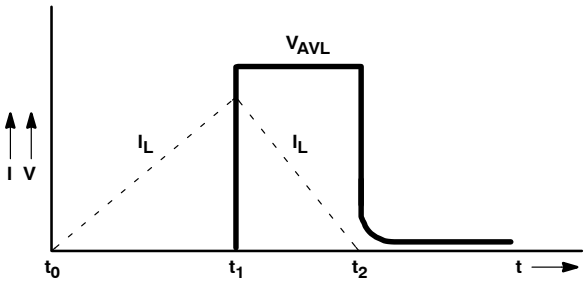


Figure 4. Avalanche Current and Voltage Waveforms

TYPICAL PERFORMANCE CHARACTERISTICS

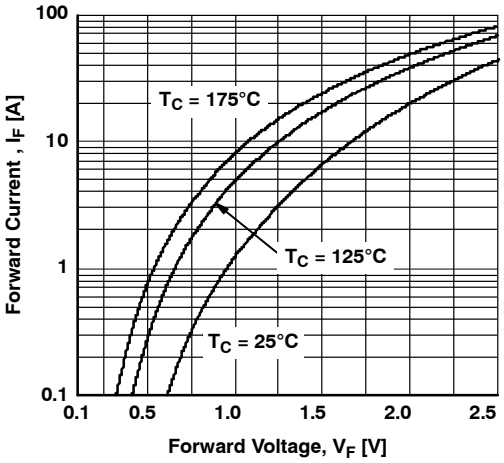


Figure 5. Typical Forward Voltage Drop vs. Forward Current

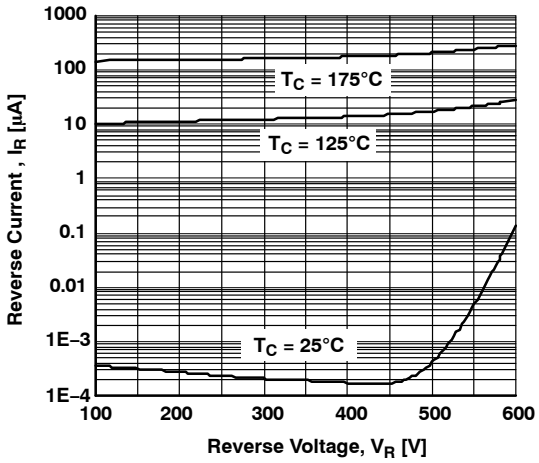


Figure 6. Typical Reverse Current vs. Reverse Voltage

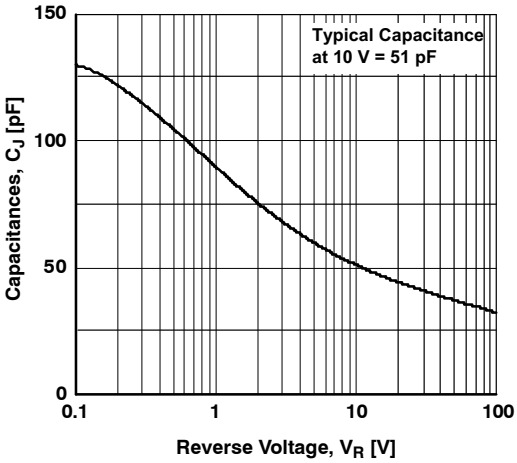


Figure 7. Typical Junction Capacitance

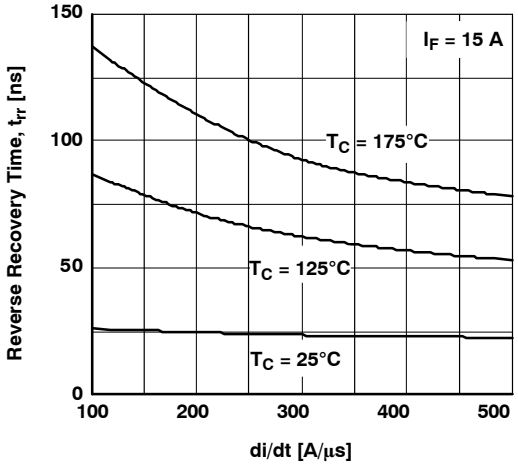


Figure 8. Typical Reverse Recovery Time vs. di/dt

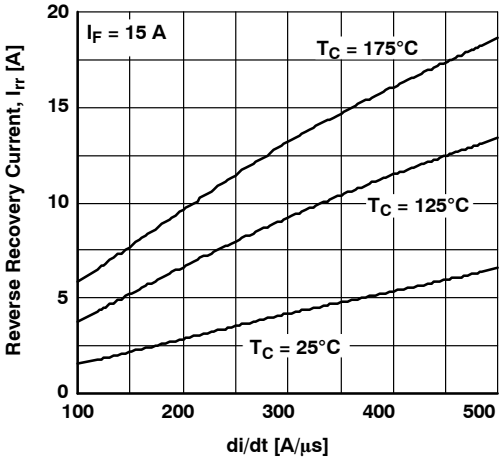


Figure 9. Typical Reverse Recovery Current vs. di/dt

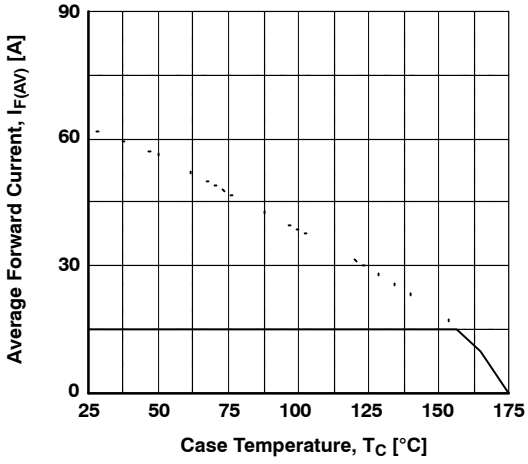


Figure 10. Forward Current Derating Curve

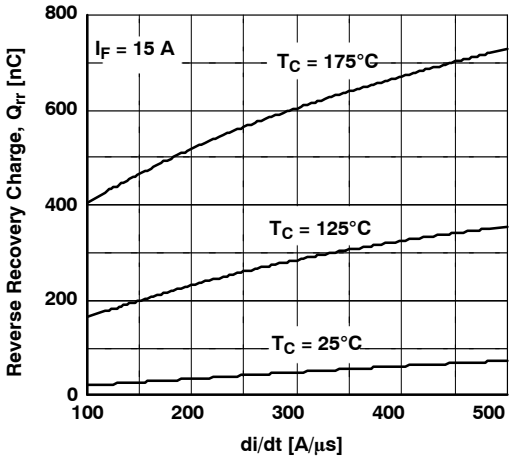


Figure 11. Reverse Recovery Charge

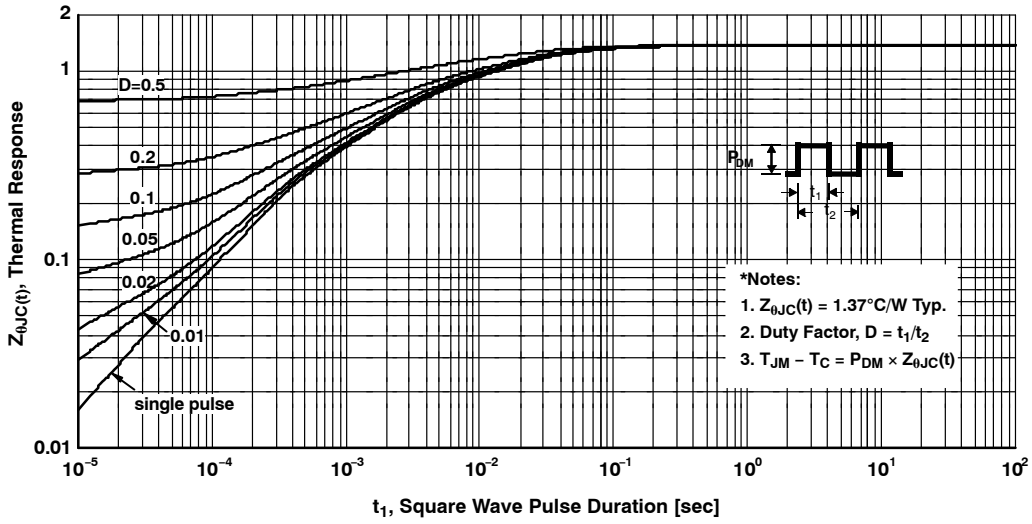


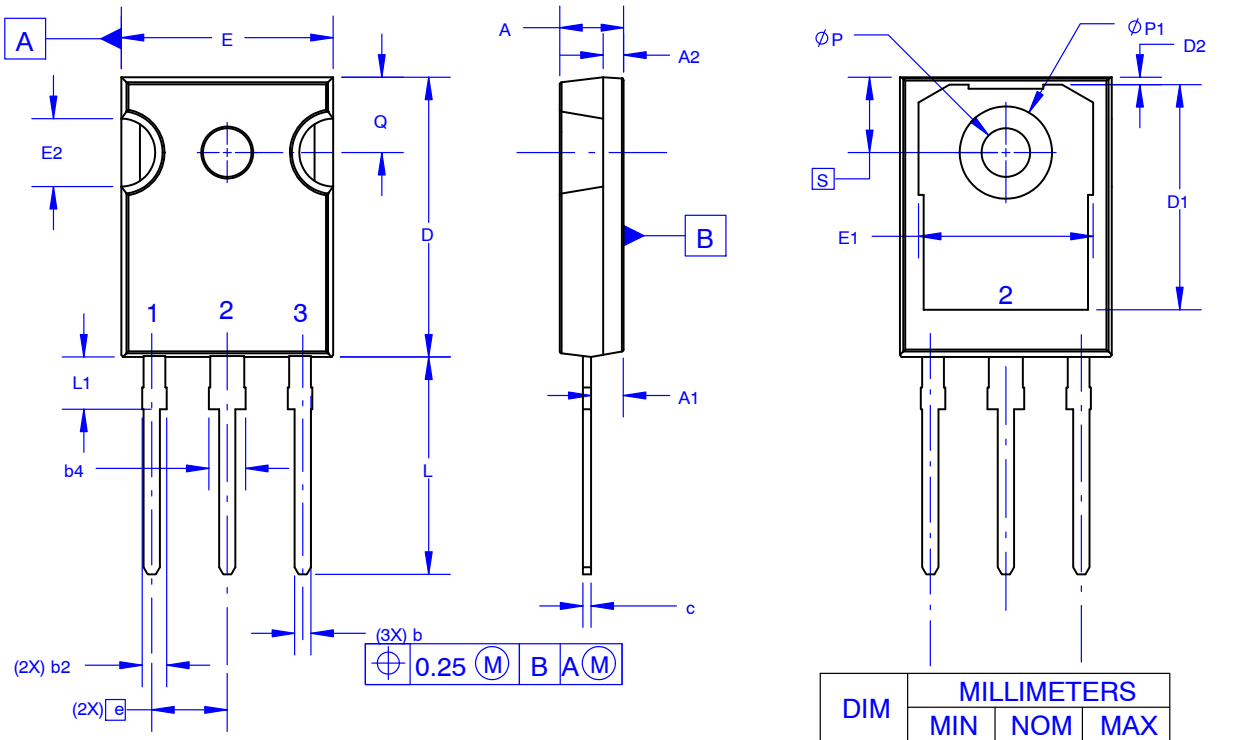
Figure 12. Transient Thermal Response Curve

MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

ON Semiconductor®

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

DATE 31 JAN 2019

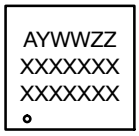


DIM	MILLIMETERS		
	MIN	NOM	MAX
A	4.58	4.70	4.82
A1	2.20	2.40	2.60
A2	1.40	1.50	1.60
b	1.17	1.26	1.35
b2	1.53	1.65	1.77
b4	2.42	2.54	2.66
c	0.51	0.61	0.71
D	20.32	20.57	20.82
D1	13.08	~	~
D2	0.51	0.93	1.35
E	15.37	15.62	15.87
E1	12.81	~	~
E2	4.96	5.08	5.20
e	~	5.56	~
L	15.75	16.00	16.25
L1	3.69	3.81	3.93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

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DESCRIPTION:	**TO−247−3LD SHORT LEAD**	**PAGE 1 OF 1**

PUBLICATION ORDERING INFORMATION

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