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Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (_), the underscore (_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.onsemi.com. Please email any questions regarding the system integration to Fairchild_questions@onsemi.com.

ON Semiconductor®

February 2017

RHRG1540CC, RHRG1560CC

30 A, 400 V - 600 V Hyperfast Dual Diode

Description

The RHRG1540CC, RHRG1560CC 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
- RoHS Compliant

Applications

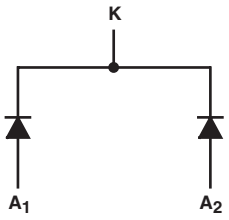
- Switching Power Supplies
- Power Switching Circuits
- General Purpose

Ordering Information

PART NUMBER	PACKAGE	BRAND
RHRG1540CC	TO-247-3L	RHRG1540C
RHRG1560CC	TO-247-3L	RHRG1560C

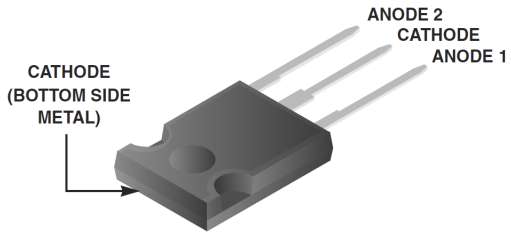
NOTE: When ordering, use the entire part number.

Symbol



Packaging

JEDEC STYLE TO-247



Absolute Maximum Rating (Per Leg) T_C = 25°C, Unless Otherwise Specified

		RHRG1540CC	RHRG1560CC	UNITS
Peak Repetitive Reverse Voltage	V_{RRM}	400	600	V
Working Peak Reverse Voltage	V_{RWM}	400	600	V
DC Blocking Voltage	V_R	400	600	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
Nonrepetitive Peak Surge Current (Halfwave, 1 Phase, 60 Hz)	I_{FSM}	200	200	A
Maximum Power Dissipation	P_D	100	100	W
Avalanche Energy (See Figure 10 and 11)	E_{AVL}	20	20	mJ
Operating and Storage Temperature	T_{STG}, T_J	-65 to 175	-65 to 175	°C

Electrical Specifications (Per Leg) $T_C = 25^oC$, Unless Otherwise Specified

SYMBOL	TEST CONDITION	RHRG1540CC			RHRG1560CC			UNIT
		MIN	TYP	MAX	MIN	TYP	MAX	
V_F	I_F = 15 A	-	-	2.1	-	-	2.1	V
	I_F = 15 A, $T_C = 150^oC$	-	-	1.7	-	-	1.7	V
I_R	V_R = 400 V	-	-	100	-	-	-	μA
	V_R = 600 V	-	-	-	-	-	100	μA
	V_R = 400 V, $T_C = 150^oC$	-	-	500	-	-	-	μA
	V_R = 600 V, $T_C = 150^oC$	-	-	-	-	-	500	μA
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
t_a	I_F = 15 A, dI_F/dt = 100 A/μs	-	20	-	-	20	-	ns
t_b	I_F = 15 A, dI_F/dt = 100 A/μs	-	15	-	-	15	-	ns
Q_{rr}	I_F = 15 A, dI_F/dt = 100 A/μs	-	40	-	-	40	-	nC
C_J	V_R = 10 V, I_F = 0 A	-	60	-	-	60	-	pF
$R_{\theta JC}$		-	-	1.5	-	-	1.5	$^oC/W$

DEFINITIONS

V_F = Instantaneous forward voltage (pw = 300 μs, D = 2%).

I_R = Instantaneous reverse current.

T_{rr} = Reverse recovery time (See Figure 9), summation of $t_a + t_b$.

t_a = Time to reach peak reverse current (See Figure 9).

t_b = Time from peak I_{RM} to projected zero crossing of I_{RM} based on a straight line from peak I_{RM} through 25% of I_{RM} (See Figure 9).

Q_{rr} = Reverse Recovery Charge.

C_J = Junction Capacitance.

$R_{\theta JC}$ = Thermal resistance junction to case.

pw = pulse width.

D = duty cycle.

Typical Performance Curves

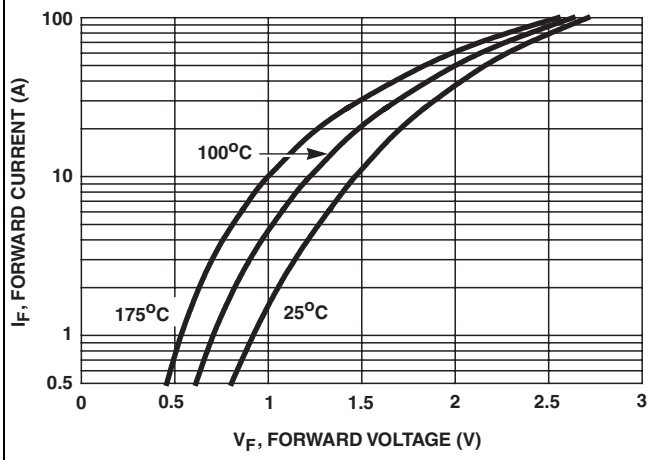


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

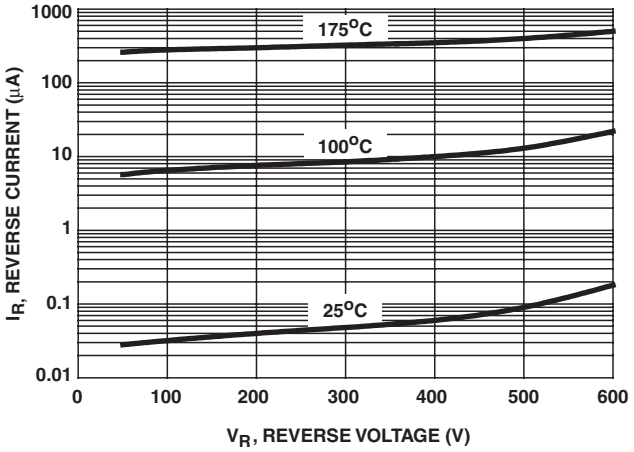


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

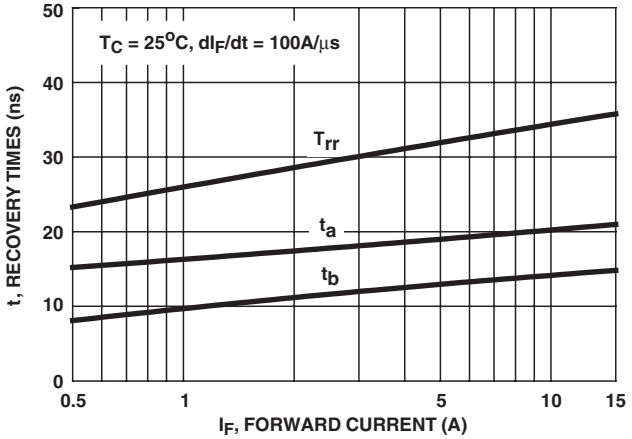


FIGURE 3. T_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

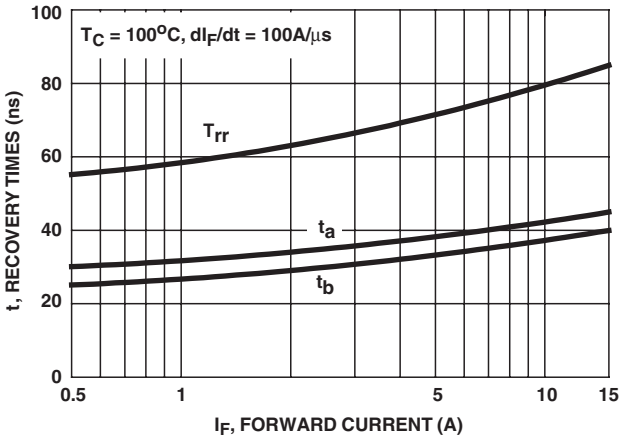


FIGURE 4. T_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

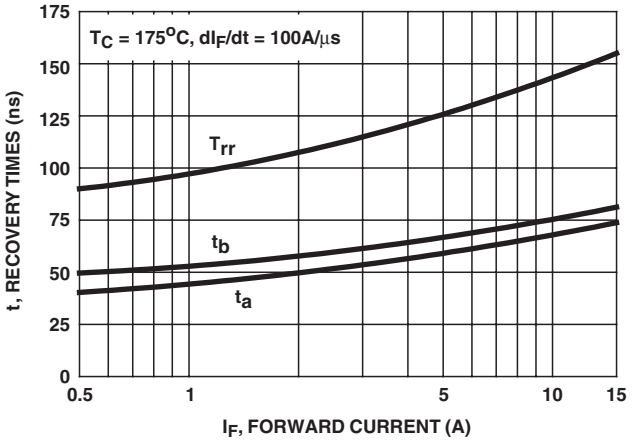


FIGURE 5. T_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

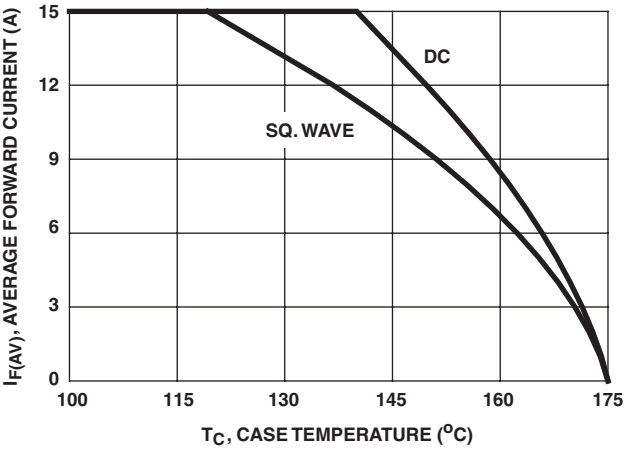


FIGURE 6. CURRENT DERATING CURVE

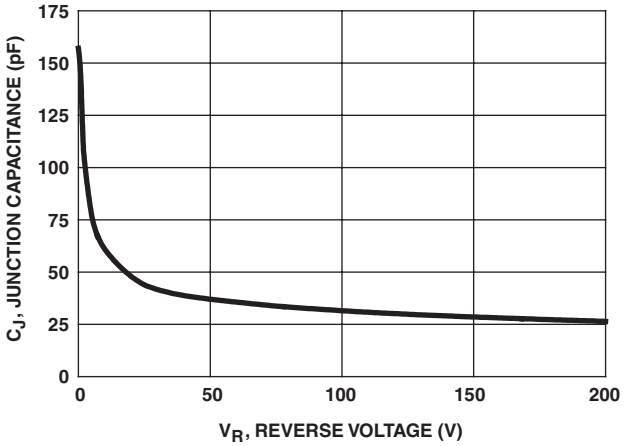


FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

Test Circuits and Waveforms

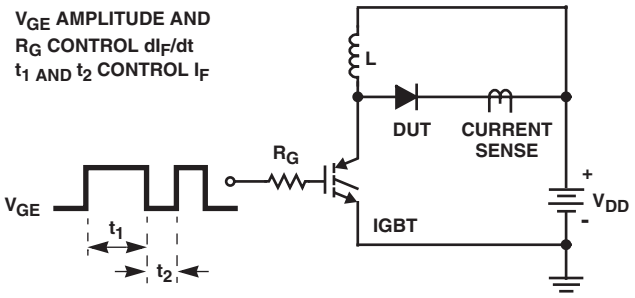


FIGURE 8. T_{rr} TEST CIRCUIT

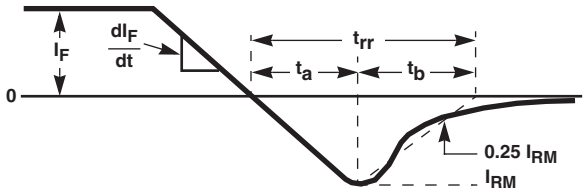


FIGURE 9. T_{rr} WAVEFORMS AND DEFINITIONS

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

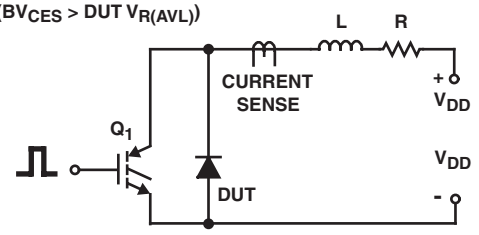


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

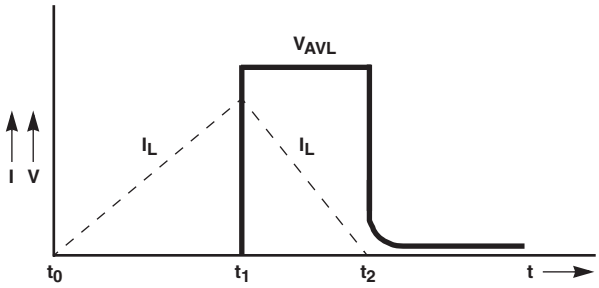
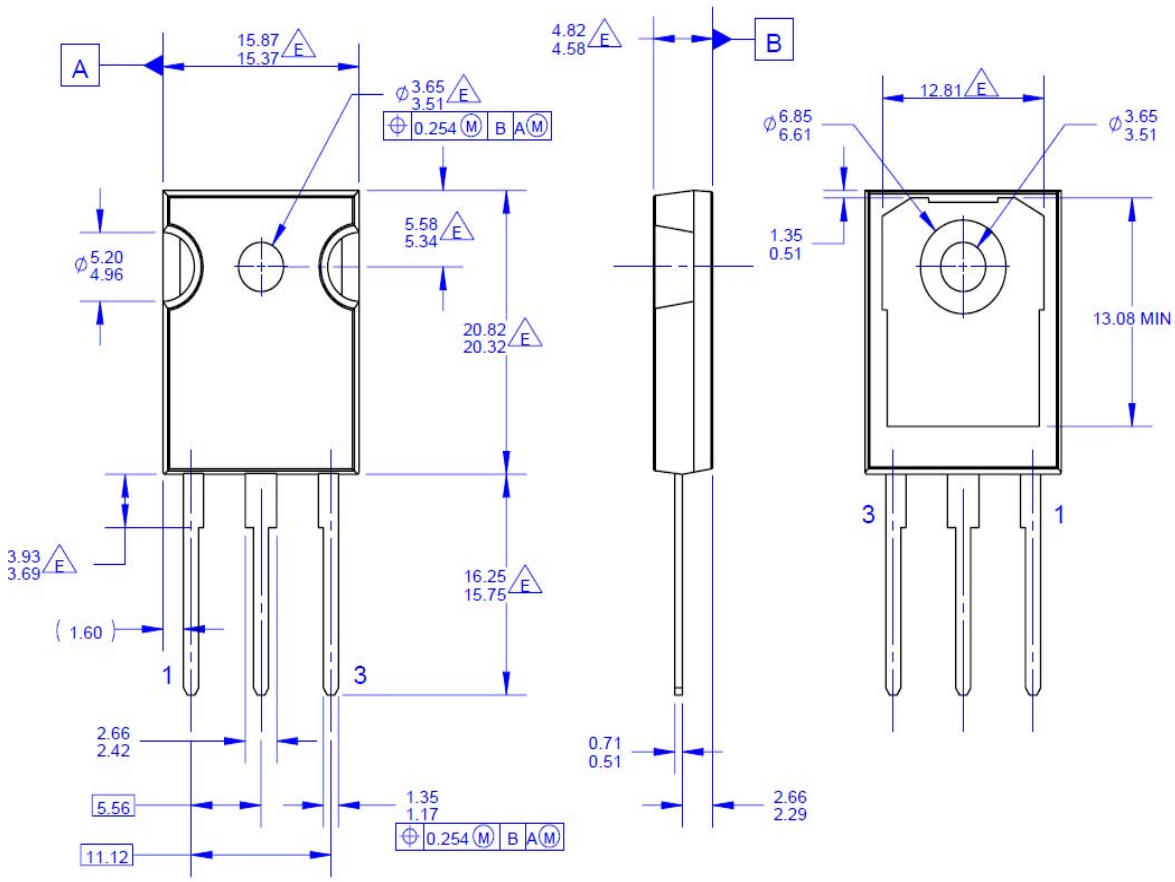


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

Package Dimensions



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

E. DOES NOT COMPLY JEDEC STANDARD VALUE
F. DRAWING FILENAME: MKT-TO247A03_REV03

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